

Cruise Report
R/V Falkor - Cruise FK151005
2015 October 5 – 2015 November 10
Honolulu to Guam

William W. Sager
Department of Earth and Atmospheric Sciences
312 Science and Research Building 1
University of Houston
Houston, TX
77204



Crew

Captain:	Bernd Buchner
First Officer	Paul Shepherd
Second Officer	Allan Doyle
Second Officer	Taigh MacManus
Bosun	Lars Toensfeldt
Lead Deck Hand	Wendel Virrey
Deck Hand	Henrik Ewert
Deck Hand	Michael Shönherr
Chief Engineer	Miroslav Mirchev
Second Engineer	Rass Tolstrup
Third Engineer	Ramon Tabaque
Assistant Engineer	Mario Sagristani
ETO	Erik Niedermeier
Fitter	Jonice Laspinas
Fitter	Dante Sarzuelo
Purser	Adriana Zamudio
Chef	Grzegorz Kuberski
Chef	Matthew Knight
Stewardess	Leny Pancito
Stewardess	Shiella Bonita
Lead Marine Technician	Leighton Rolley
Marine Technician	Viet Huehnerbach
Marine Technician	James Cooper

Scientists

Chief Scientist	William Sager	University of Houston
Co-chief Scientist	Jinchang Zhang	South China Sea Institute of Oceanology
Outreat specialist	Suraida Nañez-James	Texas State Aquarium
Scientist	John Neese	University of Houston
Scientst	John Greene	Texas A&M University
Scientist	Yanming Huang	Texas A&M University
Scientist	Panya Khan	University of Houston
Scientist	Andrew Pineda	University of Houston
Scientist	Vaughn Robla	University of Houston
Scientist	John Serna, Jr.	University of Houston
Scientist	Sriharsha Thoram	University of Houston
Scientist	Jennifer Welch	University of Houston
Scientist	Rachel Edwards	Texas A&M University Corpus Christi
Scientist	Juan Ward	Schmidt Ocean Institute

Summary

Cruise FK151005 on R/V *Falkor* had the objective of collecting magnetic field measurements and depth soundings over the massive Tamu Massif volcano of Shatsky Rise oceanic plateau. The magnetic data, in particular, are thought to be critical for understanding the development of this massive volcano. New bathymetry data will help map the shape of the volcano. The cruise left Honolulu on 5 October 2015 and arrived in Guam on 10 November 2015. In this 36-day period, *Falkor* transited 10 days to Tamu Massif, surveyed the volcano for about 20 days, and transited 6 days to Guam. The cruise was highly successful, collecting continuous data on 98% of the planned ship tracks, despite some days lost to weather conditions. The entire Tamu Massif survey encompasses a region almost 1 million square kilometers in size. Approximately 1.67 million magnetic readings and 94 million depth soundings were recorded. Preliminary data over Tamu Massif show a linear positive anomaly along the volcano's axis flanked by anomaly lows. This pattern may indicate a mechanism of formation similar to seafloor spreading.

How Did the “World’s Largest Single Volcano” Form at a Triple Junction? A Magnetic and Bathymetry Survey of Tamu Massif, Shatsky Rise

Background

Formation of Oceanic Plateaus

Shatsky Rise, located in the western Pacific Ocean near Japan (Fig. 1) is one of the largest oceanic plateaus. Like many, it is a huge volcanic mountain range consisting mainly of basalt covered with a mostly thin veneer of sediments (Sliter and Brown, 1993; Sager et al., 1999). Over the past couple of decades, there has been a debate among geoscientists about the mechanism by which oceanic plateaus such as Shatsky Rise are formed. Because many are enormous volcanic piles, it is commonly thought that plateaus form via massive eruptions from a mantle plume. A widely-accepted explanation is the “plume head” hypothesis, which says that a large mass of thermally-buoyant material arises from the core-mantle boundary region as a new mantle plume is formed (Richards et al., 1989). When the plume head reaches the base of the lithosphere, it causes a massive eruption and the emplacement of igneous material, forming large oceanic plateaus if under oceanic lithosphere and continental flood basalt provinces if under continental lithosphere (Richards et al., 1989; Duncan and Richards, 1991; Coffin and Eldholm, 1994). This model gained wide acceptance during the 1990s mainly because geochronology data from several continental flood basalt provinces and oceanic plateaus appeared consistent with short-lived and massive emplacements of lava and magma (Coffin and Eldholm, 1994; Coffin et al., 2006). The geodynamic significance of this hypothesis is that it implies periods with high flux of mantle material to the Earth’s surface (Duncan and Richards, 1991). Moreover, such massive eruptions also imply the release of large quantities of heat and gasses, which could have far-ranging environmental effects (Coffin and Eldholm, 1994; Larson, 1991).

An alternative idea (the “fertile mantle” hypothesis) is that plateau eruptions occur where plate boundaries or plate cracks release pressure above areas of the upper mantle with lower melting temperatures (Anderson et al., 1992; Anderson, 2001; Foulger, 2007). This hypothesis implies that the source of plateau magma is the shallow mantle and that the large vertical mantle convection implied by the plume head hypothesis does not occur. In addition to different implications about magma source, the two hypotheses suggest different mechanisms of oceanic plateau formation. The plume head hypothesis implies great eruptions, with most of a plateau being emplaced in a short amount of time, perhaps a million years or less (e.g., Coffin and Eldholm, 1994). The fertile mantle hypothesis makes no such prediction. Indeed, because eruptions result from changing stresses, often at plate boundaries, the volcanism may be less focused in time and space (Foulger, 2007).

A simple interpretation of these hypotheses is that a plume head would create a large volcano in a short, effusive, voluminous eruption, whereas extended eruptions from stress release at a plate boundary might form a series of coalescing volcanoes over a longer time. Oceanic plateau structure is key to figuring out whether this dichotomy is true, but plateau structure is poorly known because these features are large, remote, and poorly surveyed.

Despite initial acceptance of the plume head hypothesis, the question about mechanism is still open because existing observations do not fit a simple plume model. For example, the

huge Ontong Java Plateau formed over a short period of time (Neal et al., 1997), but its emplacement was almost entirely below sea level, whereas significant dynamic uplift is expected from a thermal plume head (Korenaga, 2005). The massive Kerguelen plateau contains significant complexities (e.g., continental rock – unexpected in an oceanic plateau) as well as a prolonged eruptive period, not the short emplacement expected from a plume head (Coffin et al., 2002; 2006). In addition, rocks dredged and cored on Shatsky Rise are mostly similar to mid-ocean ridge basalts (formed in the shallow mantle), rather than deep mantle material (Mahoney et al., 2005; Sano et al., 2012). Moreover, oceanic plateaus often occur near triple junctions (Sager, 2005; Foulger, 2007; Hochmuth et al., 2015) a coincidence that is unexpected for a plume head and suggests a connection between the ridges and magma source. Today, Earth scientists are still debating which of these two mechanisms is a better explanation for the great plateaus. Depending on whom you talk to, the plume head model either requires amendments or to be thrown out. As is often the case in scientific debate, neither hypothesis may be entirely correct, but these two concepts provide a framework for debate that will ultimately help geoscientists understand this important flux of material to the Earth's surface.

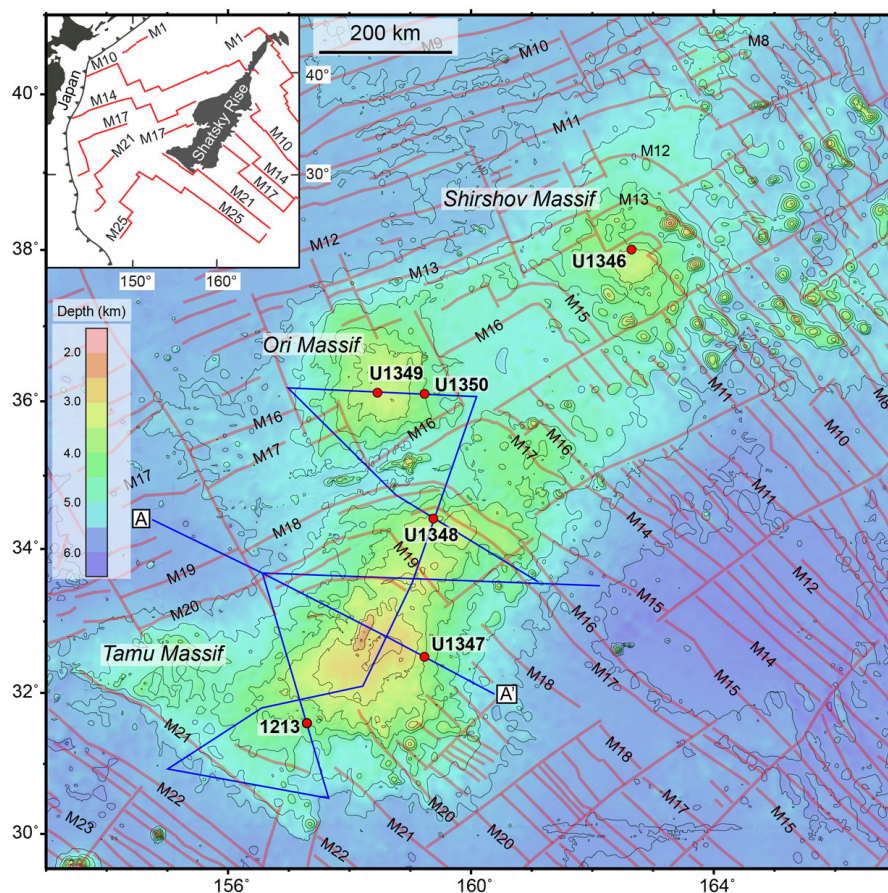


Figure 1. Bathymetry and tectonic map of southern Shatsky Rise. Bathymetry is from satellite-predicted depths (Smith and Sandwell, 1997). Heavy red lines show magnetic lineations (Nakanishi et al., 1999). Blue lines show multichannel seismic reflection profiles collected on R/V *Marcus G. Langseth* (Sager et al., 2013). Filled red circles show locations of ODP and IODP drill sites cored on recent expeditions. Inset depicts the location of Shatsky Rise relative to Japan and nearby subduction zones (toothed lines) and the wider magnetic pattern.

How Shatsky Rise Helps Understanding Oceanic Plateau Formation

Shatsky Rise has several characteristics that make it ideal for understanding oceanic plateau formation. It was thought to be a good example of a plume head eruption because it has a morphology and tectonic evolution that seems to fit that expected from this hypothesis (Sager et al., 1999; Nakanishi et al. 1999). Initial eruptions appear to have been massive and rapid (Sager and Han, 1993), forming Tamu Massif and causing a ridge jump of ~800 km (Nakanishi et al., 1999). Subsequent eruptions formed progressively smaller edifices with time, implying a transition between plume head and plume tail (Sager, 2005). Other indications are not so clear. Shatsky Rise formed at a triple junction where at least two of the intersecting plate boundaries (and maybe the third) were mid-ocean spreading ridges (Sager et al., 1988; 1999; Nakanishi et al, 1999). The coincidence of plume head and ridges is not explained by the plume head hypothesis and is an unlikely occurrence without a connection between the two (Sager, 2005). In addition, all igneous rock samples investigated to date have isotopic and geochemical characteristics similar those of mid-ocean ridge basalt (Mahoney et al, 2005; Sano et al., 2012). No recovered material has an obvious, primitive lower mantle chemical signature as may be expected from a plume head. In addition, the summits of the volcanic edifices do not appear to have been highly emergent as is expected for the dynamic uplift of a plume head (Sager et al., 2013; Zhang et al., 2015).

Magnetic anomalies recorded in the Shatsky Rise crust make it unique among ancient large oceanic plateaus. The plateau formed during a time when the geomagnetic field was undergoing reversals (Sager et al., 1988; Nakanishi et al., 1999), unlike many of the other large oceanic plateaus that erupted during the Cretaceous Quiet Period. This means that magnetic anomalies can be used to investigate the structure of Shatsky Rise and understand its connection to the mid-ocean ridges. Past locations of the mid-ocean ridges are traced by magnetic isochron geometry (Fig. 1). They show that Shatsky Rise began forming around the time of anomaly M21 (~147 Ma), coincident with a major reorganization of the spreading ridges at the triple junction (Sager et al., 1988; Nakanishi et al, 1999; Nakanishi et al., 2015). Subsequently, the triple junction followed the axis of Shatsky Rise from M21 to M1 time (~124 Ma) as two more large volcanoes formed, (Ori and Shirshov massifs; Fig. 1) and finally a low volcanic ridge (Sager et al., 1988; Nakanishi et al., 1999).

Recent Investigations of Shatsky Rise

Shatsky Rise was investigated recently by IODP Expedition 324 (Sager et al., 2010; 2011) and a two-part multichannel seismic survey (Sager et al., 2013; Zhang et al., 2015). The objective of the Expedition 324 was to core igneous rock for geochemical and volcanologic studies. Cores recovered from the expedition showed that Tamu Massif, the largest Shatsky Rise volcanic edifice, is characterized by thick, massive basalt flows up to ~23 m thick (Sager et al., 2010; 2011). Such massive flows imply extraordinarily effusive eruptions and are also found in continental flood basalt provinces (Bryan et al., 2010). Moreover, the Tamu Massif igneous section from Site U1347 is remarkably similar to that from Ontong Java Plateau Site 1185. These findings strengthen the connections between Tamu Massif and Ontong Java Plateau as well as the connection between oceanic plateaus and continental flood basalts. The seismic surveys, carried out in 2010 and 2012 with the R/V *Marcus G. Langseth*, collected seismic refraction profiles and deep-penetration multichannel seismic profiles across Tamu and

Ori massifs (lines shown in Fig. 1). Seismic refraction data show that Tamu Massif crust is up to ~30 km thick, so although Tamu Massif is not tall, most of it extends below the seafloor, like an iceberg (Korenaga and Sager, 2012). The multichannel seismic profiles image subparallel lava flow packages descending down the slopes of the volcano from its summit (Sager et al., 2013; Zhang et al., 2015), implying that Tamu Massif is a huge central volcano. This is unlike many large volcanic edifices (e.g., Hawaii, Iceland), which are formed from multiple centers. This finding is noteworthy because Tamu Massif ranks among the largest volcanoes in the solar system. We currently know of no larger *single* volcano on Earth.

After these efforts, what is the status of the contest between plate and plume hypotheses to explain Shatsky Rise? To a large degree, the debate continues because of lack of a consensus about what constitutes evidence of a plume. Moreover, the term “plume” is not used consistently, often meaning only thermal upwelling from somewhere in the mantle (in contrast to Morgan’s (1971; 1972) definition of a thermal diapir from the deep mantle). In addition, the fertile mantle hypothesis is poorly developed (Foulger, 2007), so it makes few testable predictions. As a result, final impact of Shatsky Rise on the debate is not yet clear. Many new publications have come out or are in progress with somewhat different views. It is clear that Tamu Massif and Shatsky Rise formed from extraordinary volcanism. Drilling and seismic data support the idea that Tamu Massif eruptions featured massive sheet flows that likely traveled long distances, resulting in anomalously shallow volcanic slopes (Sager et al., 2013; Zhang et al., 2015). The smooth slopes of Shatsky Rise massifs contrast to earlier predictions (Sager et al., 1999) that formation near spreading ridges likely caused flank faulting and modification (Zhang et al., 2015). This may be a result of long-distance flows burying the flanks. An observation that does not fit well into this picture is the consistency of lava flow slopes with depth inside Tamu Massif. Despite some sections where lava flows are imaged 4-5 km deep in the volcano, there is no significant change in volcanic slope (Zhang et al., 2015), as might be expected if eruptions piled up near the center, depressing that part of the volcano (like seaward dipping reflector sequences, e.g., Mutter, 1985). This requires extraordinary balance in the distribution of lava flows.

Favoring the plume head mechanism are several observations. The size of Tamu Massif, its robust volcanism, and the subsequent diminution of magmatic output all fit the plume model (Sager et al., 1999; Nakanishi et al., 1999). Geochemistry and isotopic characteristics have been used to argue that enrichment of Shatsky Rise magmas has resulted from slab material recycled through the lower mantle by a plume (Heydolph et al., 2014). Geochemistry studies from cored lavas indicate that eruptions were sourced deeper (18-24 km) than typical mid-ocean ridge basalts (MORB) and at higher degrees of partial melt (15-20%) (Sano et al., 2012; Husen et al., 2013). The geochemical enrichment interpretation is highly model-dependent and is not certain that the abundant anomalous volcanism or the extra depth and partial melt percentage require a plume source (Natland and Winterer, 2005; Foulger, 2007).

Arguing against a plume source are geochemical and isotopic studies that display a similarity between Shatsky Rise tholeiitic lavas and mid-ocean ridge basalt (Mahoney et al., 2005; Sano et al., 2012; Husen et al., 2013). Samples plot near the geochemical and isotopic fields of East Pacific Rise MORB, although these samples are different in being enriched in incompatible elements (Sano et al., 2012). While some scientists argue that the differences are enough to favor a plume source, others counter that the same compositions are well within the

global MORB field (Natland, 2013). Evidence of the eruptive history of Shatsky Rise is still being compiled, but preliminary radiometric dates from Site U1347 cores on Tamu Massif indicate an unexpected age gap of ~4 Myr between magmatic pulses (Heaton and Koppers, 2014). This finding seems counter to the plume head model prediction of a short eruptive span (Coffin and Eldholm, 1994). Seismic evidence may also point to a non-plume source as Korenaga and Sager (2012) found a negative correlation between seismic velocity and crustal thickness within Tamu Massif, an observation that implies passive upwelling of normal temperature (Korenaga and Sager, 2012). This model depends on several assumptions about the source and eruption style, so the impact of this observation is unclear.

What is clear is that Tamu Massif was a massive volcano formed in an extraordinary volcanic event. Recent studies of Shatsky Rise have raised many questions that still need to be sorted out, among them how such a massive volcano can form and evolve at the mid-ocean ridge system, itself a massive volcanic system. The structure and evolution of the Tamu Massif volcano are critical observations that can tilt the balance in the debate about conflicting models.

Research Questions and Study Rationale

In addition to the broader question of the source depth of ocean plateau magma, the formation of the huge Tamu Massif volcano very near one or more mid-ocean ridges poses an important research problem relative to the formation of oceanic plateaus: how does such a massive volcano form at or near mid-ocean ridges? The mid-ocean ridges themselves are immense, linear volcanoes at which the oceanic crust is formed. A normal mid-ocean ridge causes upper mantle upwelling and focusing of magma at beneath the ridge (e.g., Sinton and Detrick, 1992). Magma is pulled from a broad area of the shallow upper mantle, perhaps 100 km deep by 500 km in width (MELT Seismic Team, 1998). What happens when an additional upwelling zone (a plume) is added? Several authors have examined the problem of plume-ridge interaction by modeling a plume beneath or close to the spreading ridges (e.g., Ito et al., 2003; Mittelstaedt et al., 2011; Georgen, 2011). They find that plume upwelling can be channeled to the ridge crest to form anomalously thick crust or result in ridge jumps caused by magmatic heating or shear traction on the base of the plate (Mittelstaedt et al., 2008; 2011). In general, the width of ridge affected by the plume increases with upwelling flux and excess buoyancy but decreases with spreading rate, upwelling viscosity, and plume-ridge separation (Ito et al., 2003). Magmatic heating affects the thickness of the lithosphere and controls ridge jumps with jumps inhibited by lower temperatures and thicker plates. In addition, the time for a ridge jump to occur decreases depending on the amount of heating, the plate age, and spreading rate (Mittelstaedt et al., 2011).

Most such studies have been focused on slow spreading or small plumes, so it is unclear whether they are appropriate for a plume head at a triple junction of fast-spreading ridges as is the case for Shatsky Rise. Tamu Massif is an immense volcano that formed by melting at greater depths and at higher partial melt fractions than normal mid-ocean ridges (Sano et al., 2012; Husen et al., 2013), but it is unclear whether this melting regime replaced, augmented, or occurred separately from the normal formation of oceanic lithosphere.

Two present-day or recent volcanic plateaus may be instructive: Iceland and the Azores plateau. The Greenland-Iceland-Faroe volcanic ridge has formed at or near the Mid-Atlantic

Ridge over a period of several tens of millions of years with the massive Iceland platform forming over the past ~17-18 Myr (Foulger and Anderson, 2005). Seismic sounding of the mantle indicates a columnar low velocity zone in the upper mantle (and perhaps deeper) that many scientists equate with a mantle plume (Montelli et al., 2006); although, this interpretation is not accepted universally (Foulger and Anderson, 2005). At Iceland, the excess volcanism seems to augment the mid-ocean ridge without changing the overall dynamics. Although there is a large bathymetric swell beneath the Iceland section of the Mid-Atlantic Ridge, ~2500 km in width (Ito et al., 2003), crustal spreading at Iceland seems much like normal seafloor spreading, except that thicker crust (~35-40 km; Darbyshire et al., 1998) is developed. Magnetic anomaly data over and around Iceland show that the linear magnetic anomalies formed by seafloor spreading continue through Iceland (Fig. 2; Ryan, 1990); although, the anomalies change from being strikingly linear adjacent to Iceland to ragged as they pass through the island. This departure from linearity probably occurs because the upper Iceland crust consists of large, individual volcanoes (Sigmundsson, 2005) that are three-dimensional rather than strictly linear. The coherent magnetic lineations, however, imply that Iceland forms by the addition of hotspot magma to the normal ridge volcanic process. If Shatsky Rise was simply a Jurassic Iceland, we would expect to find similar magnetic lineations within its volcanic edifices. Indeed, magnetic lineations are seen in some locations within Shatsky Rise (Fig. 1; Nakanishi et al., 1999).

Similar to Shatsky Rise, the Azores Plateau formed asymmetrically at a triple junction, which consisted of two segments of the Mid-Atlantic Ridge and the Terceira Rift, a slowly moving, mainly extensional boundary between Europe and Africa (Gente et al., 2003). The plateau was formed between 20-7 Ma from episodic hotspot volcanism (Gente et al., 2003). Excess volcanism was emplaced primarily on the African and European plates as a result of relative motion of the hotspot and the plate boundaries as well as triple junction geometry (Georgen and Sankar, 2010; Georgen, 2011). As at Iceland, magnetic isochrons can be traced through the thickened crust of the Azores Plateau.

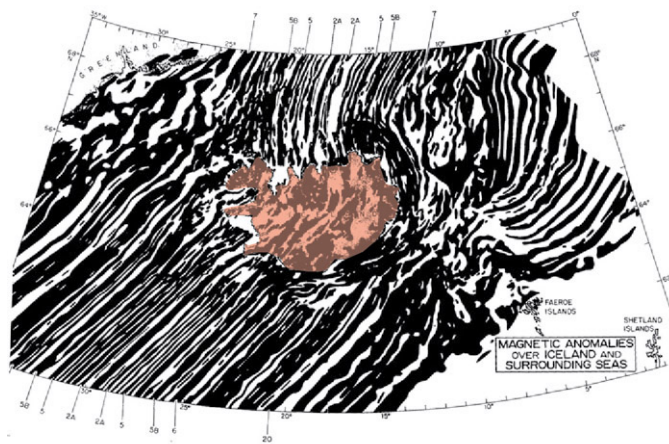


Figure 2. Magnetic anomalies in the vicinity of Iceland (pink area). Black (white) areas show positive (negative) anomalies. Linear anomalies are created along the Mid-Atlantic Ridge crest, which divides Iceland. Although anomalies over Iceland itself are not as linear as those in surrounding basins, they can still be traced through the island. (from Ryan, 1990)

Although Iceland and the Azores Plateau have similarities to Shatsky Rise, they are not exact analogs. The Iceland platform formed over a longer time interval (~17-18 Myr) than is thought likely for Tamu Massif (less than several Myr) (Sager, 2005). Furthermore, Iceland is a high island, whereas there is no unequivocal evidence that Tamu Massif was emergent (Sager

et al., 2013). The Azores plateau also formed over a long time period (~13 Myr) and did not produce a plateau as thick as Shatsky Rise (Gente et al., 2003). In addition, both Iceland and the Azores formed at slow spreading ridges, whereas Shatsky Rise formed along fast spreading ridges.

In contrast to these observations implying normal crust formation within many plateaus, recent findings from Tamu Massif suggest a different development. Drilling and seismic data give the picture that Tamu Massif is an immense central volcano (Sager et al., 2013a; Zhang et al., 2015). Such a structure implies that massive eruptions would have overwhelmed the ridge volcanism, building an extensive shield and burying antecedent topography with volcanic flows (Sager et al., 1999; Nakanishi et al., 1999). This model implies a drastically different magnetic structure. Magnetic lineations form where the spread of lava flows is limited and the entire vertical section of crust maintains the same polarity. A massive volcano would have a complex, non-linear anomaly if it erupted over multiple polarity periods. If erupted within a short period of time, it would have a coherent anomaly, but not magnetic lineations. Sager and Han (1993) noted that a large positive anomaly exists over Tamu Massif and attributed this structure to the entire edifice having formed rapidly during a single reversed polarity period. Figure 3 shows a cartoon explaining how the magnetic structure would differ from an augmented ridge (Iceland type) vs. a massive volcanic pulse.

Existing magnetic data from Shatsky Rise imply that Tamu Massif may have evolved as a hybrid of these two mechanisms. Linear magnetic anomalies have been traced through the northeast flank of this volcano (Fig. 1; Nakanishi et al., 1999), but not the summit and southwest side. As seen in Figure 1, the southwest flank is parallel to M21 in the Hawaiian lineations whereas the northwest flank follows M20 in the Japanese lineations. In contrast, anomalies M19-M17 pass through the northeast flank and anomalies M20-M18 pass into the southeast flank (Fig. 1). Several unidentified linear magnetic anomalies may also occur closer to the center of Tamu Massif (Fig. 1; Nakanishi et al., 1999).

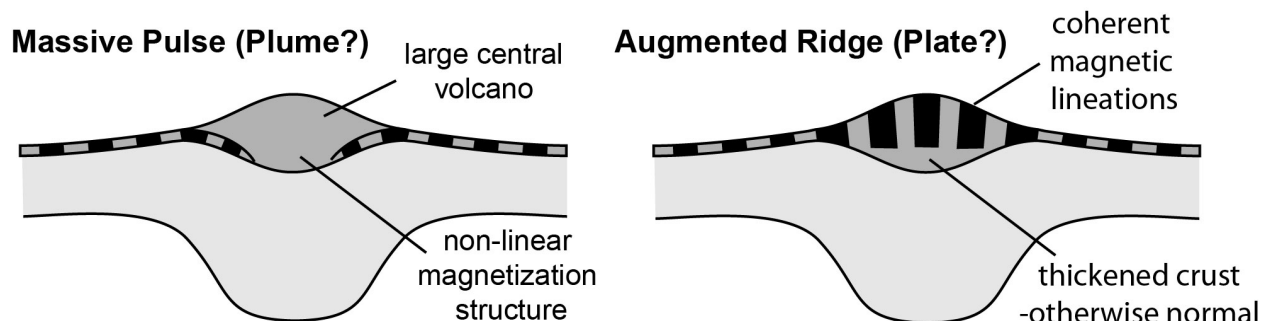


Figure 3. Cartoon showing expected distribution of magnetic anomalies from massive central pulse (above) and augmented ridge (below) formation mechanisms.

Shatsky Rise Magnetic Anomalies

The proposed study examined the magnetic anomalies of Tamu Massif to see whether the hybrid nature is valid (i.e., confirm whether there are places magnetic lineations traverse Tamu Massif and places where they do not) and to investigate the magnetic structure of Tamu Massif and its implications for the volcanic and tectonic evolution of the edifice. Determining the locations and identities of magnetic lineations and their relations to the surrounding

lineation pattern is a primary focus because these anomalies can be used to infer the evolutionary history.

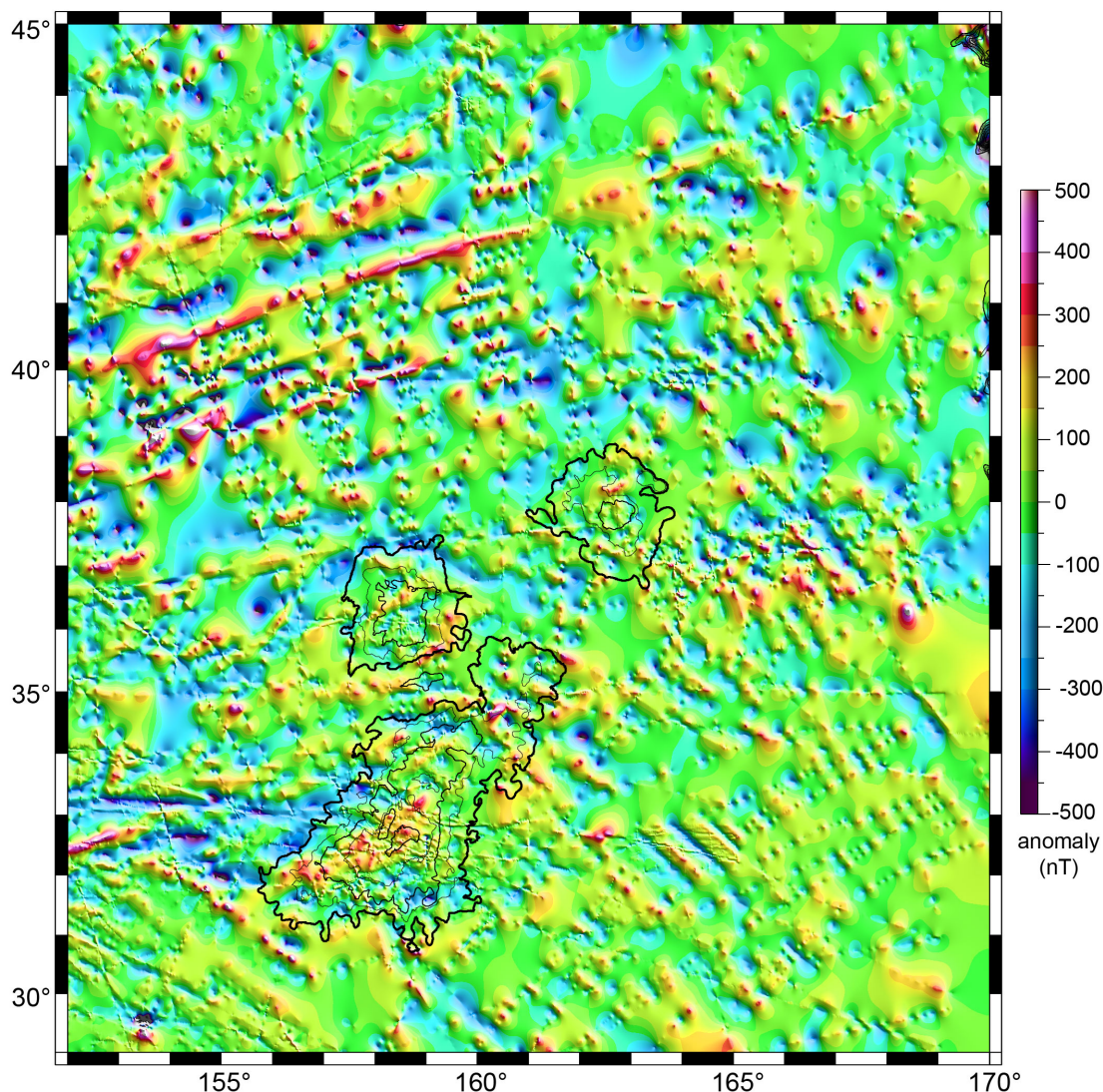


Figure 4. Compilation of magnetic anomaly data over Shatsky Rise and environs. Contours show the locations and shapes of the three massifs. Positive anomalies are in hot colors and negative anomalies are denoted by cool colors.

Figure 4 is a compilation of magnetic anomaly data over Shatsky Rise and environs (Huang and Sager, 2013). One can see the striking linearity of the Japanese lineations to the northwest, the Hawaiian lineations to the south, and to a lesser degree the Hawaiian lineations to the southeast. Magnetic lineations appear to transect the rise, as noted by Nakanishi et al. (1999). Notably, this map seems to show subdued linear magnetic anomalies crossing the northeast part of Tamu Massif. It also shows linear magnetic anomalies within Ori Massif parallel to the Japanese lineations, implying that this edifice formed like Iceland. Figure 5 shows Tamu Massif in detail from the same compilation. A clear M21, trending NW-SE, borders the southwest flank. Quasi-linear magnetic anomalies are indicated on the north side of Tamu

Massif. On the southeast side, the linear magnetic anomalies interpreted by Nakanishi et al. (1999) are not obvious. The bulk of Tamu Massif is characterized by a broad positive anomaly over its center, trending SW-NE, with flanking lows on the northwest and south flanks. This anomaly geometry was analyzed by Sager and Han (1993) who concluded that it indicates that most of Tamu Massif has a reversed magnetic polarity, indicating rapid emplacement. At face value, the change in anomaly character from one side of Tamu Massif to the other implies that the center and southwest part of Tamu Massif formed by the pulse mechanism whereas the northeast part formed more like Iceland. However, seismic data show no obvious difference in structure across the volcano (Zhang et al., 2015).

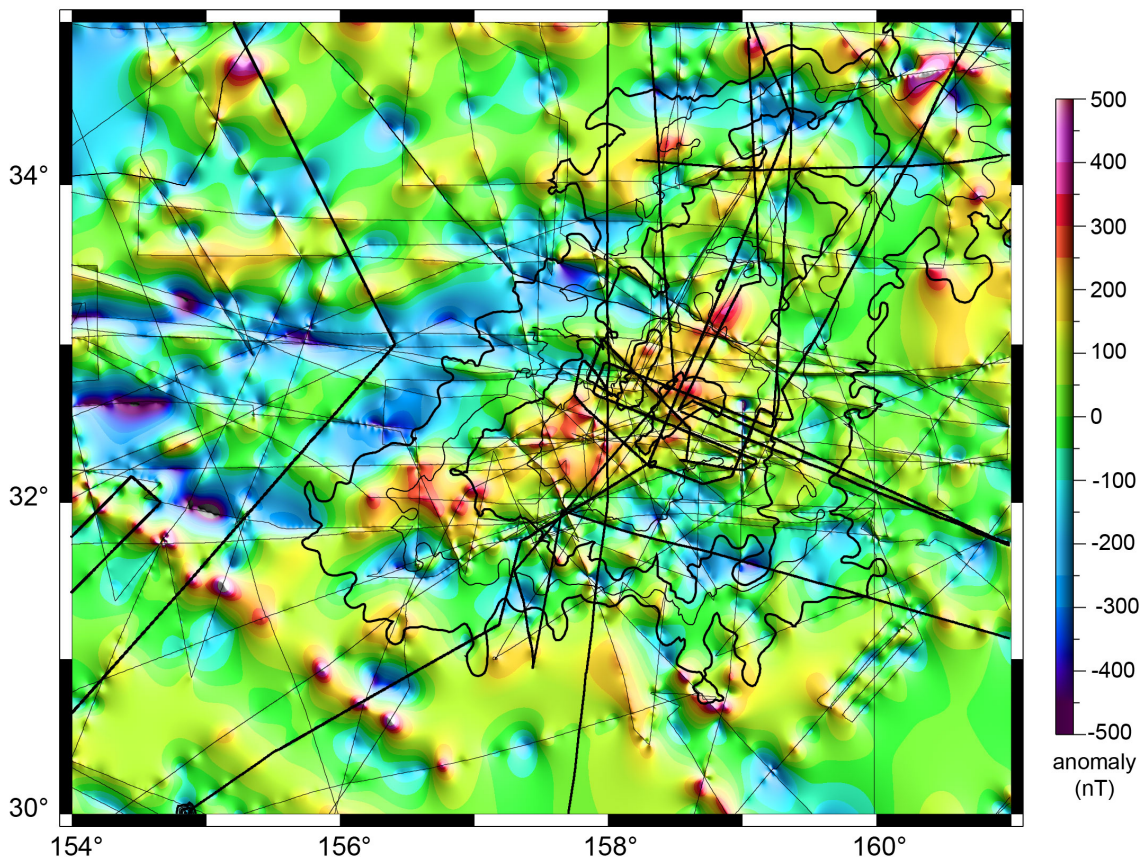


Figure 5. Magnetic anomaly map over Tamu Massif. Curving black lines show bathymetry contours for reference. Heavy contours are at 1 km intervals. Ship tracks with magnetic data are shown by thin and heavy black lines. Heavy lines denote tracks positioned with GPS navigation.

Why is a Magnetic Survey Needed?

Shatsky Rise is criss-crossed by dozens of ship tracks over the past 60 years. Data from 88 cruises were used to make Figure 4. In addition, it has been visited recently by the IODP and seismic cruises, which also collected magnetic data. Why are more data required? The problem is that the existing data set is heavily biased toward old cruises, highly heterogeneous, and haphazardly located because it has been collected over decades on unrelated cruises. In addition, many older cruise magnetic data exhibit errors, for example, recording the anomaly but not the original value (so the data cannot be corrected with a recent field model). Most

tracks are only transits over the rise. The vast majority of cruises occurred before the introduction of GPS navigation (Fig. 5), so large location uncertainty is the norm. In addition, data collected on the IODP and *Langseth* cruises have problems with magnetic interference. The IODP data had to be corrected for large ship-effect anomalies because the borrowed magnetometer used on the cruise was not designed for such a large ship (Kang et al., 2010). A similar problem occurred on the seismic vessel *Langseth*; the magnetometer was positioned too close to the ship because of concern that it would foul the seismic gear if towed too far astern. These problems limit the usefulness of these data sets. In addition, they represent only a few new tracks. The large dataset shown in Figure 4 has an initial RMS crossover error of ~385 nT. After correction with IGRF-11, the RMS error drops to 110 nT and after correction for predictable external fields (Model CM-4, Sabaka et al., 2002; 2004) the RMS error is reduced to ~75 nT (Huang and Sager, 2013). This variance is larger than many subtle anomalies within Tamu Massif, making it difficult to reliably trace anomalies. Furthermore, the distribution of tracks is highly heterogeneous, leaving gaps in the data that do not allow clear tracing of anomalies (Figs. 4, 5).

New analysis of linear magnetic anomalies is needed because of uncertainties in the interpretation of Nakanishi et al. (1999). These investigators traced magnetic anomalies from the exterior of Shatsky Rise into the interior. They noted that anomaly signatures often changed, but then “connected the dots” where they thought it possible to trace anomalies across the gaps between tracks. As shown in Figure 6, the spacing between tracks is large, so interpretations are uncertain. Cruise FK151005 obtained a large data set with excellent navigation and this will allow us to make a data grid and trace magnetic anomalies with more certainty. In particular, we will verify the anomalies crossing the north side of Tamu Massif and those entering the southeast flank, both of which are unclear in Figure 5, are correctly interpreted. This will determine whether Tamu Massif is really some kind of hybrid and whether the type of crustal formation changed from one side to the other.

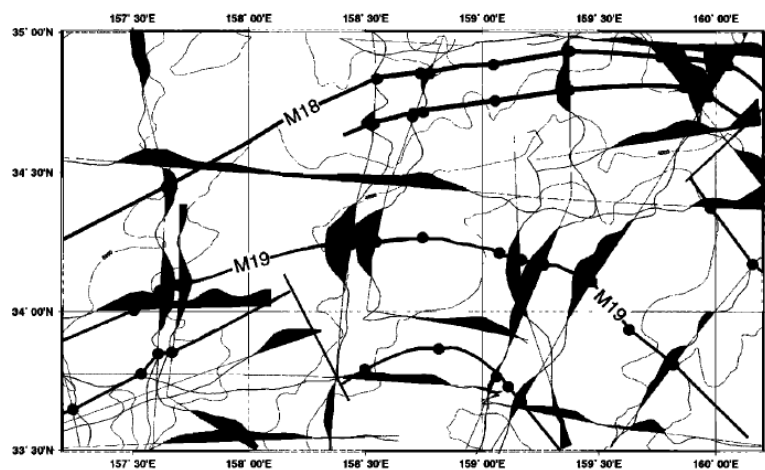


Figure 6. Magnetic anomaly interpretation on the north flank of Tamu Massif from Nakanishi et al. (1999). Ship tracks are shown by straight, thin lines, whereas “wiggly” lines show magnetic anomalies plotted perpendicular to the track. Positive anomalies are shaded with black. This figure illustrates the sparse nature of magnetic tracks over Tamu Massif.

Proposed Cruise and Research Strategy

The main goal of the cruise was to obtain a network of closely-spaced magnetic tracks covering most of Tamu Massif (Fig. 7). Not only will the new data provide more uniform coverage, but the GPS-navigated data can be used as a framework for correcting many of the

old track lines with poor navigation. Old data can be compared with the new data at trackline crossings and older tracks can be shifted to fit the new data, filling gaps between the proposed lines.

As proposed, the cruise consists of 17 north-south oriented track lines of varying lengths, spaced ~31 km (17 nm) apart (Fig. 7). This spacing was dictated by practical considerations, being the minimum spacing that can cover most of Tamu Massif with a 36-day survey (*Falkor* cruise duration maximum). The *Falkor* collected magnetic and bathymetry data along these lines. The lines are oriented N-S because this orientation records magnetic anomalies oriented SW-NE and NW-SE (orientations of magnetic anomalies in Fig. 1). The survey is designed to cover most of Tamu Massif with lines extending across identified magnetic anomalies on the periphery of the volcano. Track lines and turns in Figure 7 amount to ~6950 km (3750 nm) in length, which would take ~19.5 days at a survey speed of 10 kt. The length of the cruise was proposed as 36 days including transit from Hawaii to the study area and from there to Guam.

Equipment

As the primary goal of the cruise was to collect magnetic and bathymetry data over Tamu Massif, the main pieces of equipment in use were the EM302 multibeam echo-sounder sonar and the SeaSpy marine magnetometer. Naturally, it was necessary to know the instrument location, so the *Falkor*'s Seapath 320 GPS navigation system was used for positioning. Proper operation of the multibeam requires corrections for vertical sound speed velocity changes, so the Sippican XBT was used to determine temperature profiles in the upper water column.

EM302 Multi-beam Echo-sounder

The Kongsberg EM302 30-kHz multibeam echo-sounder was used for determining depths to the seafloor because this system is the lowest frequency multibeam system available on *Falkor*, which means it is the only one appropriate for deep sea sounding. It transmits and receives acoustic signals from a transducer array located beneath the ship's bulbous bow. The EM302 makes a swath of up to 480 soundings (in the two-ping mode as used in the survey) perpendicular to the ship track, using beams of 0.5°-1.0° x 1.0° dimension. Because the depths over Tamu Massif are mostly deeper than ~4,000 m, it was necessary to operate the sonar in the "deep" or "ultradeep" mode. In these settings, the swath width is limited to ~8-10 km width in most of the study area. A lower frequency (12 kHz) multibeam system would have allowed the swath to be larger. Nevertheless, the system worked well during the survey period and rarely lost much data owing to poor sea conditions. The EM302 sends out acoustic signals (pings) at a rate determined by water depth. During most of the survey, the ping rate was once every 6-10 seconds.

Raw sonar soundings often contain bad data, so it was necessary to delete bad soundings. Sonar data were recorded in *.all format and imported into Caris Hips/Sips Easyview software. Caris allows the user to view the swath in three dimensions and manipulate its position on the screen, so that spurious soundings stand out. These soundings were deleted and saved to new files with corrected data in x, y, z format. All soundings were corrected for vertical water velocity variations by the proprietary Kongsberg sonar operations program. XBT

readings along with sea surface salinity were input to the software, which corrects for slant-range refraction.

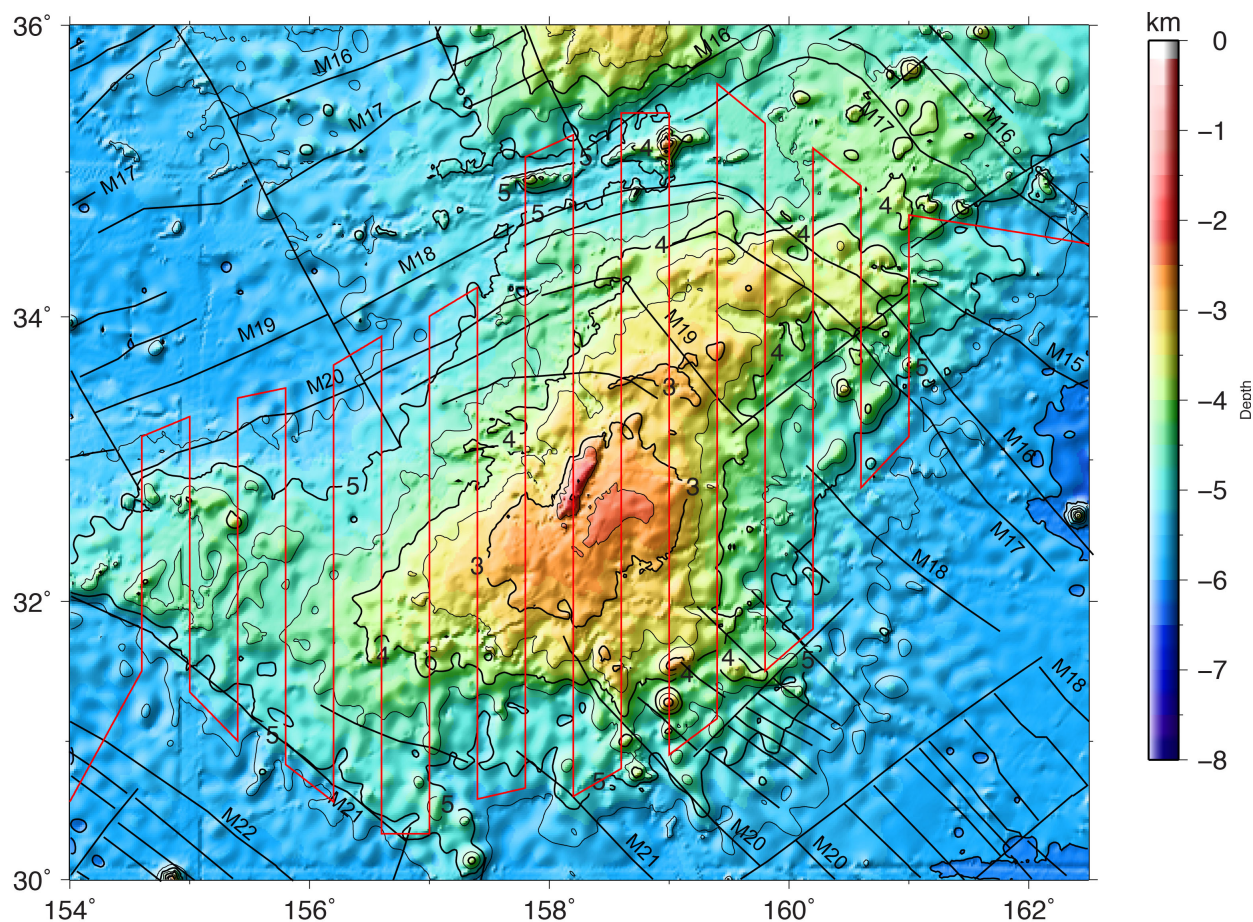


Figure 7. Proposed survey track. Red lines show proposed cruise track superimposed on satellite altimetry-derived bathymetry map with colors indicating depth (scale at right) and contours at 500-m intervals, labeled in km. Black lines show identified magnetic anomalies (from Nakanishi et al., 1999).

Expendable Bathythermograph (XBT)

The Lockheed Martin Sippican XBT system was used to record temperature profiles in the upper 1200 m of water while underway. These data are used as input to the EM302 operating software, which uses these data to make refraction corrections for the sonar sound beams. Although pressure and salinity also affect sound wave refraction, it has been found that the primary anomalies in the upper water column are caused by temperature, so it is standard procedure to use only XBT profiles for sounding data correction. XBT soundings were usually made once per day or at lesser intervals if it appeared that water mass changes had occurred.

Marine Magnetometer

A Marine Magnetics SeaSpy marine magnetometer (“maggie”) was used to make measurements of the total strength of the magnetic field. This type of magnetometer is a variant of proton precession instrument that makes measurements using the Overhauser effect. The SeaSpy maggie can make readings accurate to 0.1 nT. The “BOB” operating software by Marine Magnetics was used to run the magnetometer and collect data. Magnetic

field readings were taken at 1-second intervals and merged with the Seapath GPS navigation to provide locations for the readings. The maggie was towed on a 280-m cable behind *Falkor* to get away from the ship's magnetic field. This layback placed it ~320 m behind the GPS receiver on the mast. The Bob software allowed the data to be corrected for this layback.

Magnetic readings were decimated to an interval of one per minute and corrected for the core field using the IGRF-11 model (Finlay et al., 2010). These data were merged with depth soundings in the MGD77 file.

The ship's magnetometer cable is not mounted on a winch, so the maggie and its cable was deployed by hand over the stern. The cable was tied off on a towing point on the aft-starboard section of the fantail. A "Chinese finger" knot was used to spread the stress of towing along a section of the tow cable, so that it would not kink. During the cruise, both the ship's maggie and a spare provided by the chief scientist were used. The spare was used first, but upon inspection when recovered half-way through the cruise, it was discovered that the towfish had been attacked by sharks. The fish's fins were badly damaged (Fig. 8). In consequence, the ship's maggie was used for the second half of the cruise. It was also attacked by sharks and the cable was almost severed ahead of the fish. Altogether, it was good luck that neither was lost or irreparably damaged.



Figure 8. Damaged tail fins of the magnetometer.

Navigation

The Kongsberg Seapath 320 navigation system was used for positioning measurements during the cruise. This satellite navigation system uses inputs from Global Navigation Satellite Systems (GNSS), which include the US Navstar GPS system and the Russian GLONASS satellite

system. The Seapath uses navigation, speed, and heading inputs along with an inertial reference unit and calculates a position for the antenna, which is located on the mast. The Seapath system outputs an NMEA format file with positions and other data at 1-second intervals. These positions were used for positioning data collected during the cruise. These data were ported directly to the EM302 processing software, so that soundings were geo-referenced, and also input to the BOB software for recording magnetic data.

Cruise Narrative

Cruise FK151005 was in three parts: transit from Hawaii to the survey area, survey lines over Tamu Massif, and transit to Guam. The first transit took ~10 days, the survey ~20 days, and the last transit, ~6 days for a total of 36 days.

Transit from Honolulu to Tamu Massif: 5-15 October 2015

Falkor left the dock at Pier 31 in Honolulu at 0800 HST (1800 UT – note: times given in UT unless otherwise noted) on 5 October 2015. Several hours were spent offshore of Honolulu while calibrating the binnacle compass. By 0000 UT on 6 October, the ship was underway at 12 kt and heading west. By 0400 UT, the multibeam was recording data and by 2040 UT on the same day, the magnetometer was operational. The ship continued transiting at 10-12 kt heading generally WNW along the south side of the Hawaiian seamount chain (Fig. 9) while collecting underway multibeam soundings and magnetic field data.

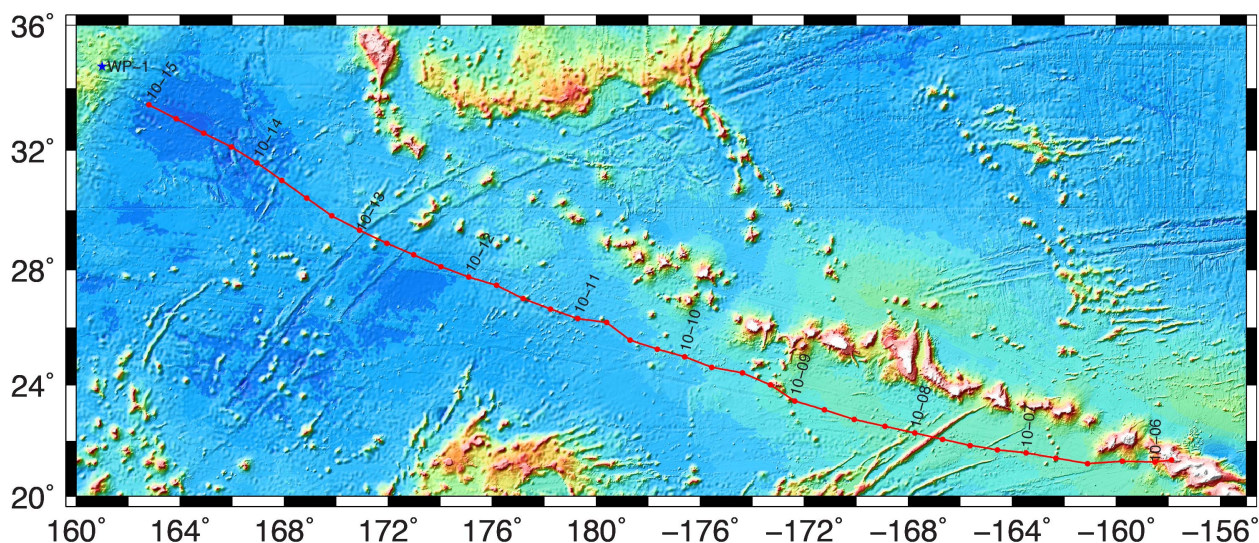


Figure 9. Transit track from 5-15 October 2015. Red dots show the ship's position every 6 hours with 0000 UT labeled with the date. WP-1 is the first waypoint on survey line 1, the beginning of the Tamu Massif survey.

During the transit, the track was adjusted to cross over seamounts and other bathymetric features. *Falkor* crossed Necker Ridge and other smaller nearby ridges at the end of 7 October and beginning of 8 October. Several small seamounts in a cluster south of Pioneer Bank and Laysan Island were crossed on the morning of 9 October. Two extensions of the Mendocino Fracture Zone were crossed during the second half of 12 October. Many magnetic anomalies were recorded on the survey track, which obliquely crossed the Hawaiian magnetic lineations (Larson and Hilde, 1975) (Fig. 10).

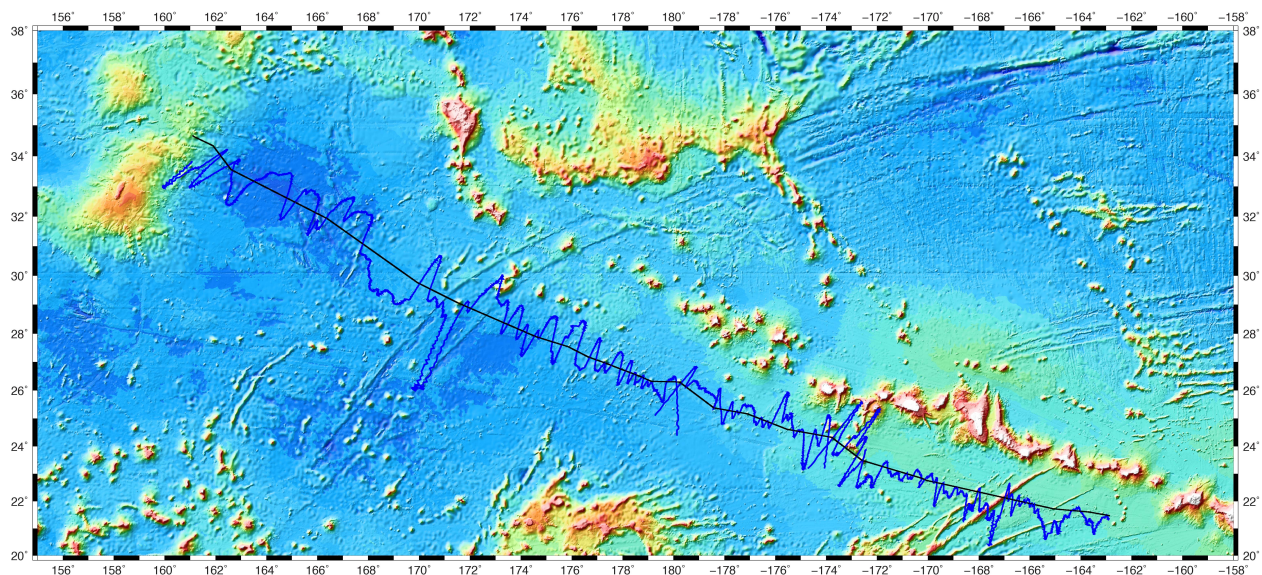


Figure 10. Magnetic anomalies recorded during the transit from Honolulu to Tamu Massif. The thin black line is the ship track and the blue “wiggly” line shows the anomaly values plotted perpendicular to the track, with positive values to the north.

Tamu Massif Survey: 15 October – 4 November 2015

The beginning waypoint for the survey, at the north end of Line 1, was reached at 1155 UT on 15 October (Table 1) and the ship turned south on the line. The planned survey speed was 8 kt to conserve fuel and collect good quality data. Lines 1 – 8 were run without incident from 15-24 October (Fig. 11) at speeds of 6.5-9.5 kt. At the end of line 8, at which point the ship was at the north end of the line, a decision was made to retrieve the magnetometer and sail WSW off the survey because of impending inclement weather caused by the merger of the remnant of typhoon Champi and a large Siberian low to the north of the survey area. Predicted wave heights at the north end of the survey were ~8 m.

Falkor sailed SW over abyssal seafloor north of Tamu Massif for a bit more than 12 hours into the early hours of 25 October. At that time, the decision was made to redeploy the magnetometer and go south, collecting data on Line 14, the idea being that the weather would clear first at the southwest end of the survey. Line 14 was run on 25 October, ending just after 0000 hrs on 26 October, and *Falkor* headed SW away from Tamu Massif after reaching the end of the line to wait on weather (Fig. 11). A bit after 0800 on 26 October, a decision was made to head for the beginning of Line 17 at the west end of the survey. The plan was to begin at the west end of the survey and run the lines sequentially eastward as time remained.

The beginning of Line 17 was attained just after 0000 hr on 27 October. The weather cooperated and Lines 17 back to 9 were run over the ensuing 7 plus days (Fig. 11) at speeds of 6.5-9.0 kt. Despite losing time to poor weather conditions, the only loss to the survey was ~50 nm of the Line 9 track because it was necessary to turn around before progressing as far north as originally planned (compare Figs. 7, 11).

Transit to Guam: 4 – 10 November 2015

The south end of Line 9 was reached at 1049 hr on 4 November, bringing to a close the survey of Tamu Massif. *Falkor* turned SW and headed for Guam, the end port for the cruise. The cruise track passed close to Minami Tori-shima Island at 24.5°N (Fig. 12). Because it is a

territory of Japan, the Japanese EEZ encompasses a circle around the island with a diameter of 200 nm. Thus it was necessary to shut off science data collection in the EEZ. The magnetometer was recovered at 0846 on 5 November and the EM302 was shut down shortly thereafter. Upon recovery, it was found that the magnetometer had been attacked and damaged by sharks. Damage included near severing of the tow cable near the head of the magnetometer. As both magnetometers were damaged, it was decided not to deploy the magnetometer after clearing the EEZ.

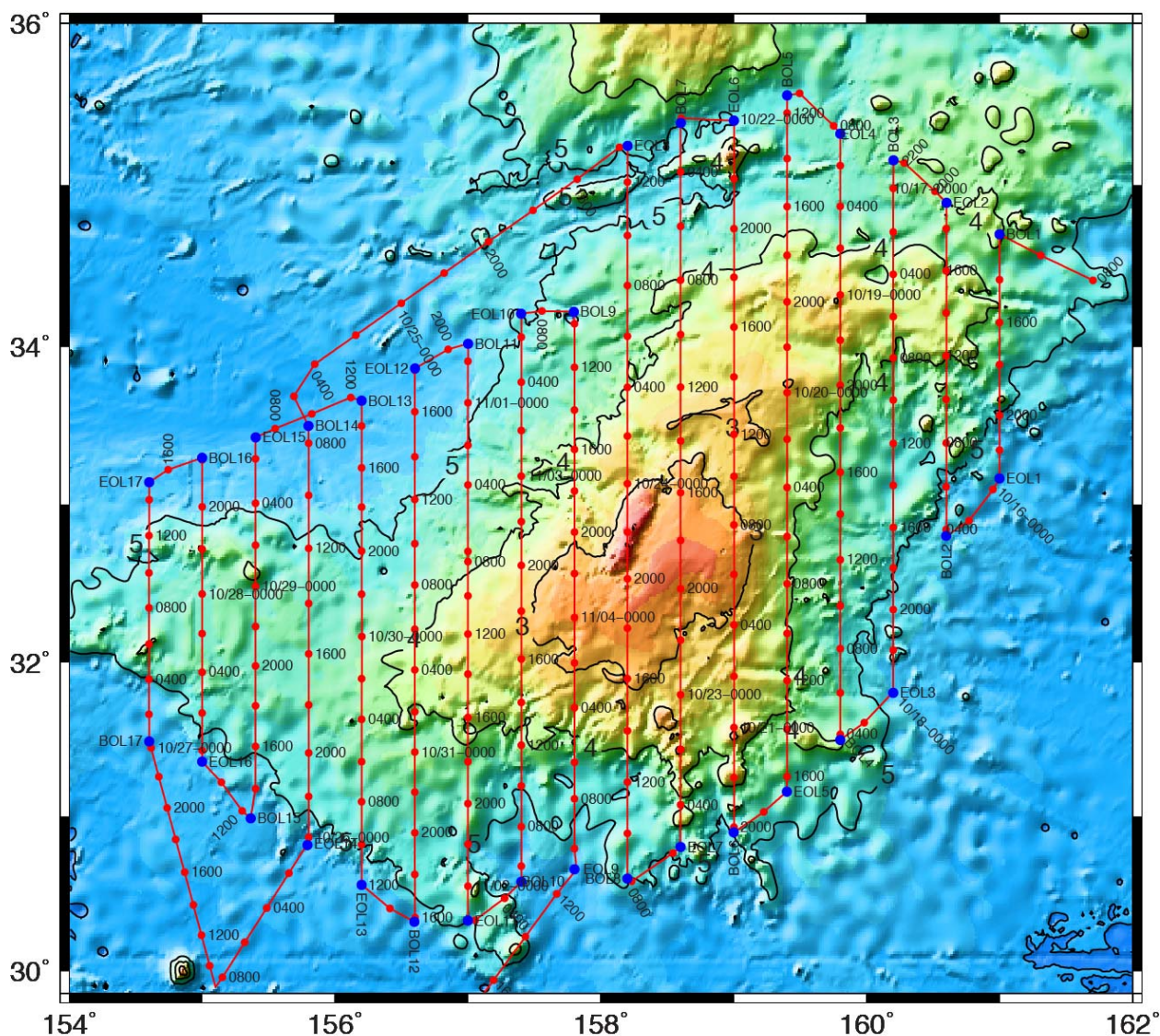


Figure 11. Survey tracks over Tamu Massif, 15 October to 4 November 2015. Red lines show the ship's track. Red dots are plotted every 2 hours with time labels every 4 hours and date labels at 0000 hours. Blue dots show the beginning ("BOL") and end ("EOL") points of each line (Table 1).

The EM302 multibeam echo-sounder was turned on again at 2325 hr on 6 November 2015. *Falkor* continued straight to port, passing Saipan and Tinian Islands on 9 November and arriving off Apra harbor before dawn on the morning of 10 November (local time). *Falkor* docked shortly afterwards to end the cruise.

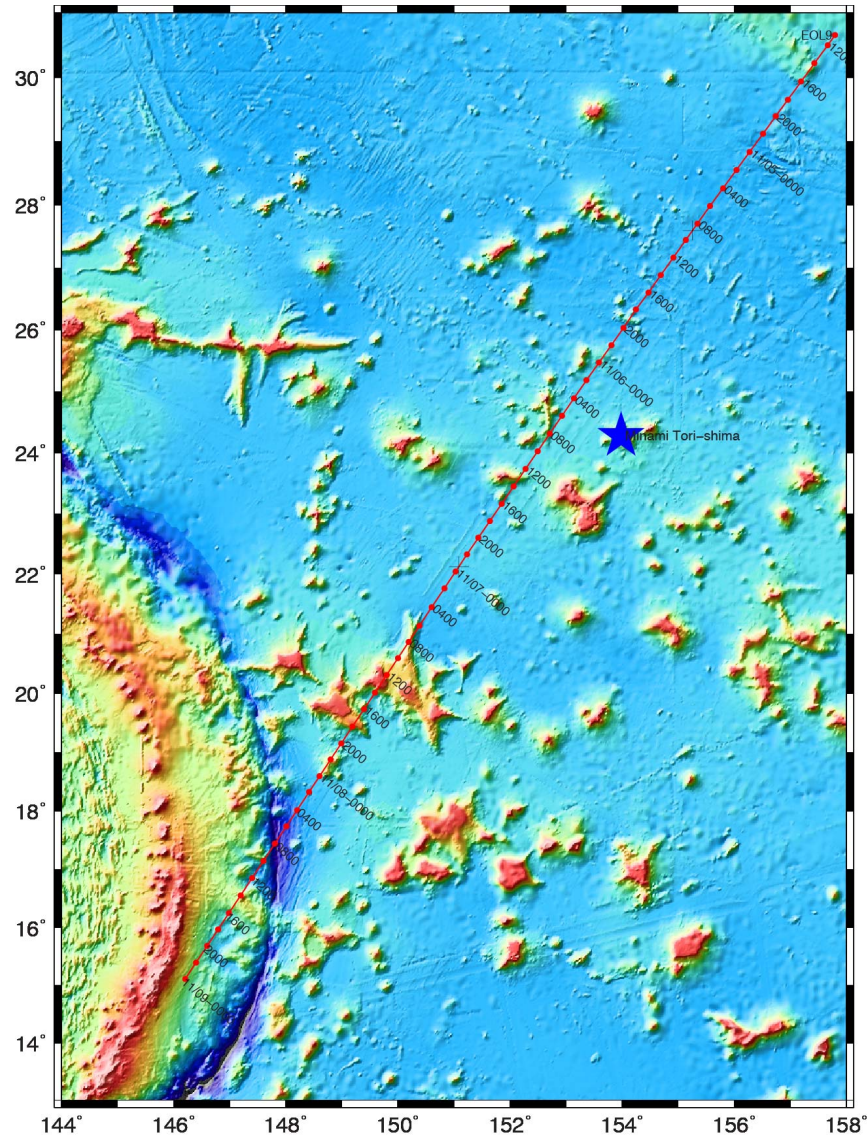


Figure 11. Transit track from Shatsky Rise to the Mariana Islands. The track is shown by the red line with red dots at 4-hour intervals. Days are labeled at 0000 hr at the start of each day.

Preliminary Results

Data collected on cruise FK151005 are of excellent quality. The magnetometers produced high quality data with only small (~ 1 nT) measurement variations owing to measurement errors. The only bad data were a small number of points that were clearly outliers. We speculate that these may have occurred during the shark attacks. In all, it is estimated that ~ 1.67 million magnetic readings were collected over Tamu Massif.

Likewise, data from the EM302 were overall of high quality. As is usually the case with multibeam echo-sounder data, it was necessary to excise bad soundings from the data set. This was easily done with the Caris software. The result was a high quality data set to be added to the overall bathymetry data set. Approximately 94 million depth soundings were recorded over Tamu Massif. All told, the survey covered a massive region as the area of Tamu Massif within the bounds of the survey is approximately 1 million square kilometers.

At preliminary look at the magnetic data shows several interesting features. Tamu Massif is characterized by a linear positive magnetic anomaly, ~ 300 nT in amplitude, striking along the axis of Tamu Massif (Figs. 12, 13). This is flanked by deep low anomalies, ~ -300 nT in amplitude, to the south and north. We speculate that these anomalies may be linear anomalies caused by crustal spreading. An interesting feature is the signature over the western “tail” of Tamu Massif, which appears not to be part of the main Tamu Massif positive anomaly, indeed, this part has a separate small positive flanked by lows. This may indicate that this part is a separate volcanic edifice. Also interesting is that Ocean Drilling Program (ODP) Site 1213 and Integrated Ocean Drilling Program (IODP) Site U1347, which have different magnetic polarities (Sager et al., 2015), plot on negative and positive parts of the anomaly, respectively (Fig. 13).

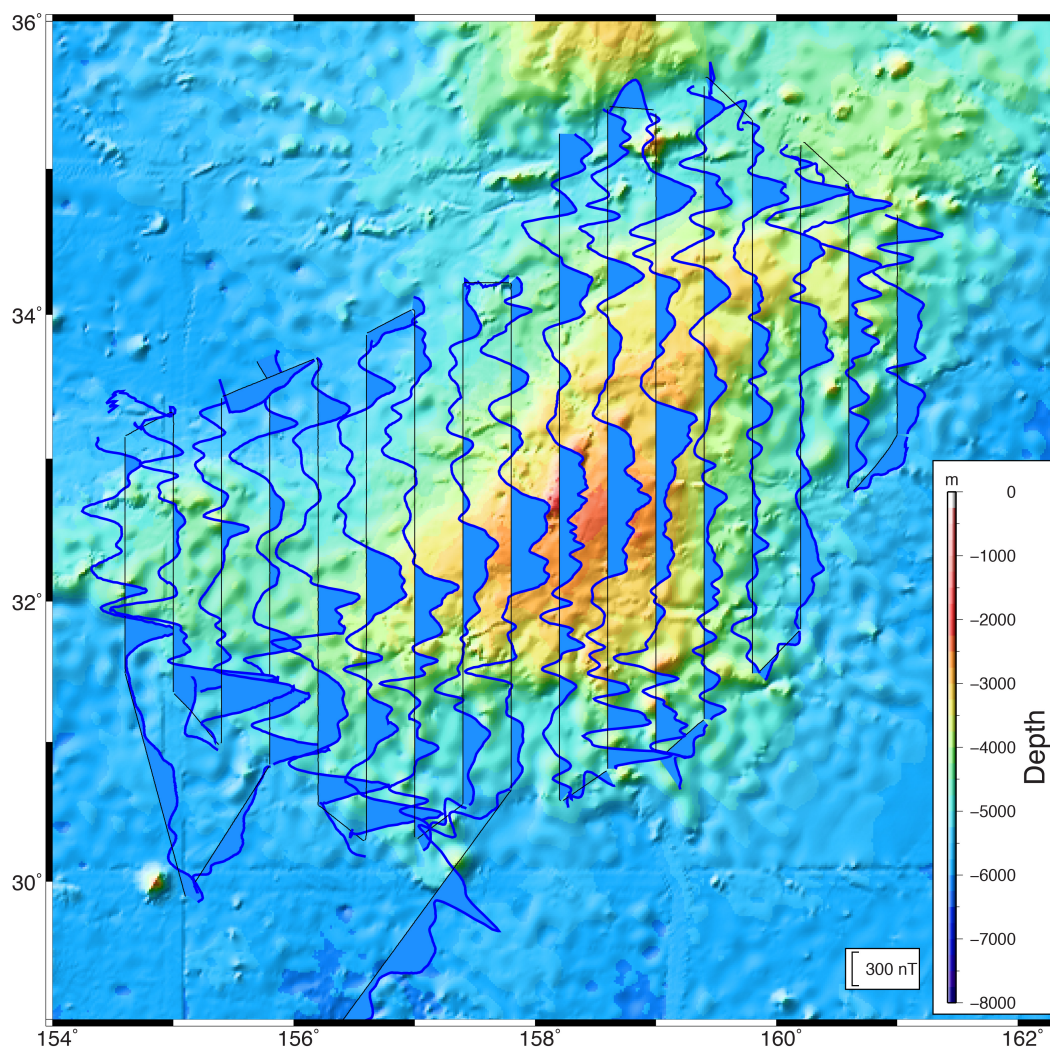


Figure 12. Magnetic anomaly data plotted over Tamu Massif. Thin lines represent ship tracks, whereas heavy “wiggly” line is the magnetic anomaly plotted perpendicular to the ship track. Postive anomalies are shaded blue. Tamu Massif is characterized by a SW-NE trending positive magnetic anomaly over its center, flanked by magnetic lows.

Surrounding Tamu Massif, several linear magnetic anomalies are noted. Anomaly M21 is prominent on the SW border and other anomalies appear nearly continuous around the NE

side. The new data, when combined with pre-existing data, should produce an excellent data set for magnetic modeling and interpretation.

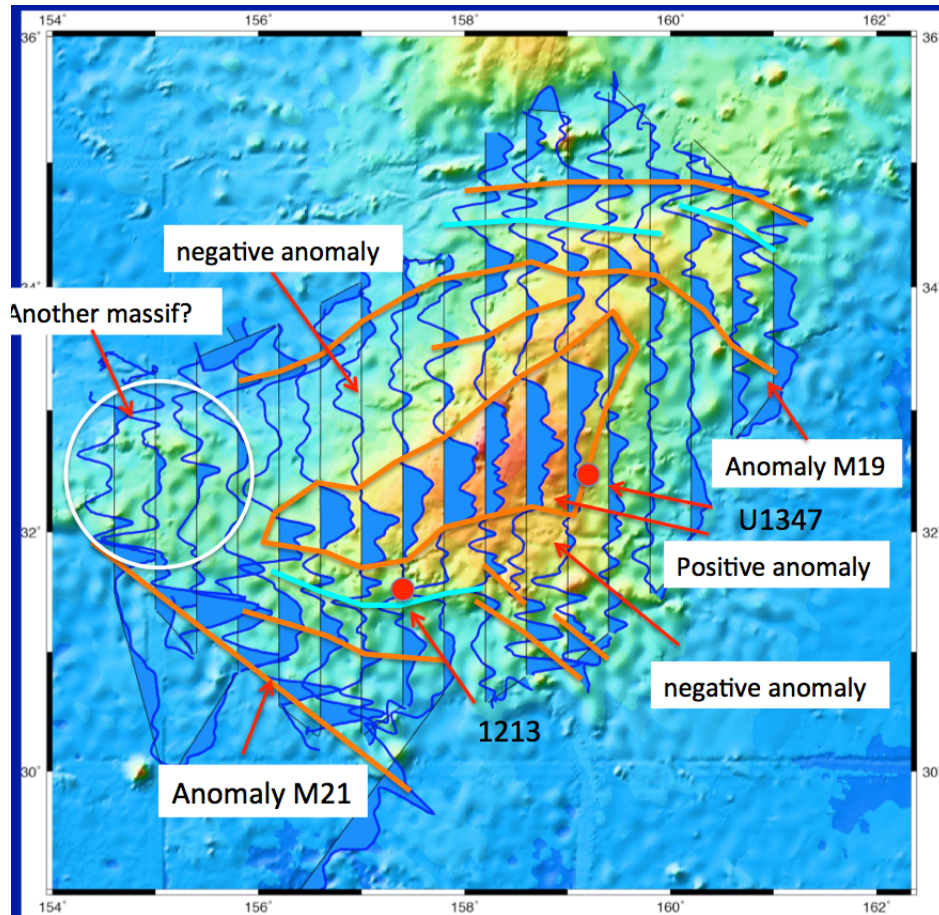


Figure 13. Preliminary magnetic anomaly interpretation of the Tamu Massif survey data. Red lines denote positive linear magnetic anomalies whereas blue lines indicate negative anomalies. Red circles indicate the positions of Ocean Drilling Program Site 1213 and Integrated Ocean Drilling Program Site U1347.

Preliminary interpretation of the bathymetry data is difficult because the data set consists of isolated swaths along the track lines, ~8-10 km in width, separated by ~31 km between tracks. These data will be valuable once added to the existing data set of soundings over Tamu Massif. Most features noted in the bathymetry swaths are smaller features, such as parasitic cones on the flanks of Tamu Massif, that can fit within one of the swaths. A number of such cones were noted (Fig. 14), as was a basal scarp on the west side of Tamu Massif (Fig. 15), and the Toronto Ridge (Fig. 16), a volcanic ridge atop the summit.

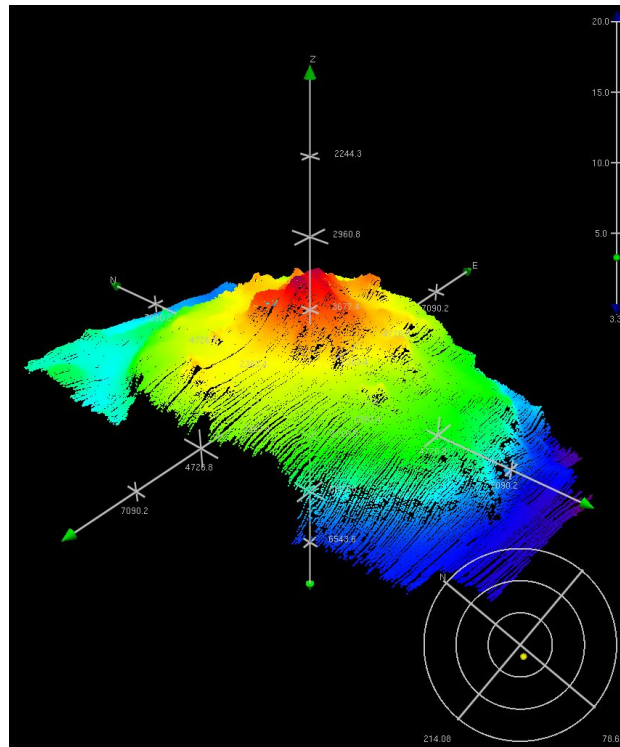


Figure 14. 3D perspective plot of bathymetry soundings from a small parasitic cone on the flank of Tamu Massif. Depths are colored with warmer colors indicating shallower depths.

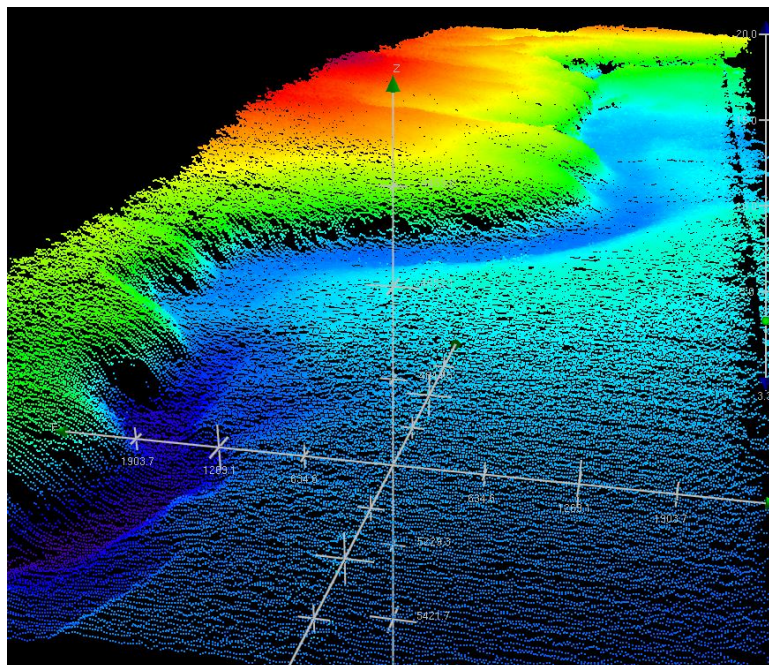


Figure 15. 3D perspective plot of bathymetry soundings from a basal scarp on the west flank of Tamu Massif. Depths are colored with warm colors denoting shallower depths. View is to the south.

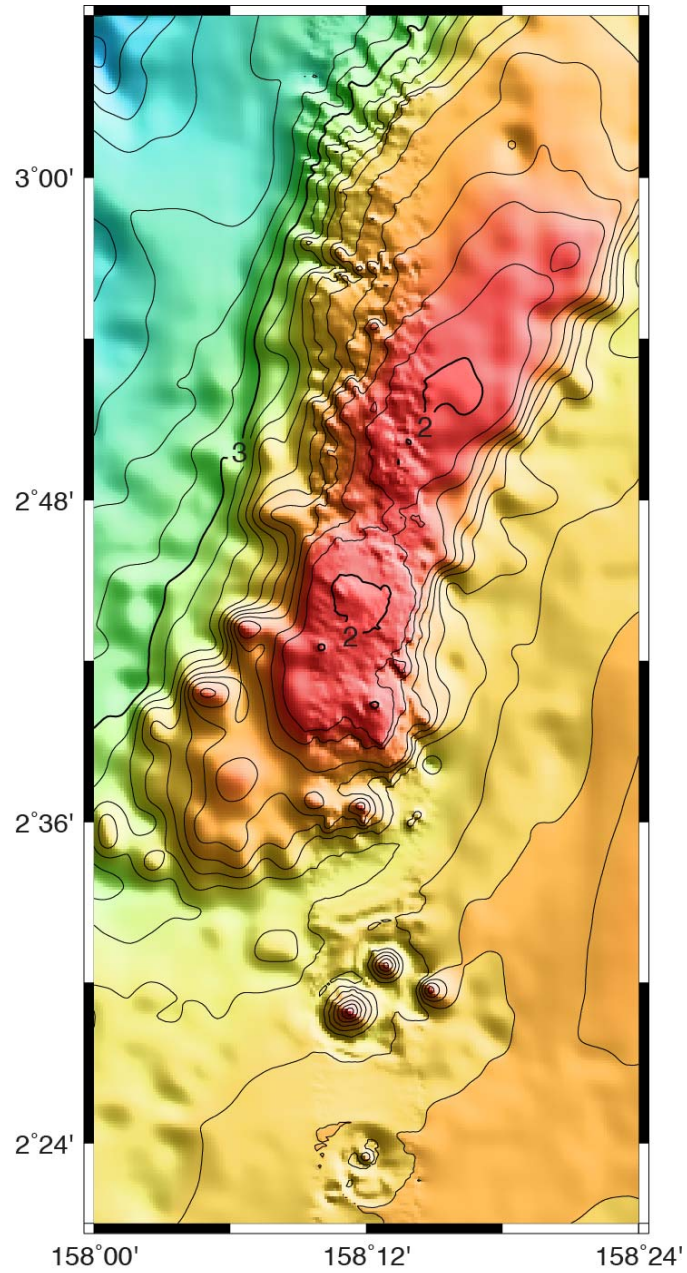


Figure 16. Plot of bathymetry data over Toronto Ridge, at the summit of Tamu Massif. Contours are shown at 100-m intervals, labeled in km. Warmer colors denote shallower depths. EM302 data are in a swath in the center of the plot, where short wavelength detail is shown. These data are merged with satellite-altimetry-based depth estimates on the sides (Smith and Sandwell, 1997).

Table 1. Tamu Massif Survey Line times and end point locations.

Line No.	Beg/End	Latitude (°N)	Longitude (°E)	Date	Time (UT)
1	Begin	34° 41.8851'	160° 59.9870'	15 Oct	11:55
1	End	33° 10.0044'	160° 59.9340'	15 Oct	23:15
2	Begin	32° 48.1984'	160° 35.9691'	16 Oct	03:36
2	End	34° 53.6592'	160° 36.0037'	16 Oct	19:09
3	Begin	35° 09.4151'	160° 12.0415'	16 Oct	22:44
3	End	31° 48.5377'	160° 11.9757'	17 Oct	23:57
4	Begin	31° 29.8304'	159° 48.0117'	18 Oct	03:42
4	End	35° 19.2683'	159° 48.0050'	19 Oct	07:30
5	Begin	35° 33.4460'	159° 23.9980'	19 Oct	11:02
5	End	31° 09.8232'	159° 23.9557'	20 Oct	16:37
6	Begin	30° 53.9688'	158° 59.9888'	20 Oct	19:43
6	End	35° 24.0376'	158° 59.9886'	22 Oct	00:08
7	Begin	35° 23.2211'	158° 36.0200'	22 Oct	02:14
7	End	30° 48.3438'	158° 35.9738'	23 Oct	05:35
8	Begin	30° 35.9513'	158° 11.9871'	23 Oct	08:14
8	End	35° 14.7536'	158° 12.0342'	24 Oct	13:29
9	Begin	34° 12.9318'	157° 47.7217'	3 Nov	09:23
9	End	30° 39.5863'	157° 48.0013'	4 Nov	10:50
10	Begin	30° 34.7073'	157° 24.0243'	2 Nov	05:12
10	End	34° 12.2083'	157° 23.9951'	3 Nov	07:00
11	Begin	34° 00.9307'	157° 00.0406'	31 Oct	21:10
11	End	30° 19.5422'	156° 59.9943'	2 Nov	01:30
12	Begin	30° 19.0502'	156° 35.7428'	30 Oct	15:46
12	End	33° 51.6417'	156° 36.0080'	31 Oct	18:04
13	Begin	33° 39.4535'	156° 12.0006'	29 Oct	12:44
13	End	30° 33.5928'	156° 11.9922'	30 Oct	11:54
14	Begin	33° 29.9430'	155° 47.9690'	25 Oct	07:19
14	End	30° 49.5095'	155° 47.5276'	26 Oct	00:13
15	Begin	30° 59.4037'	155° 21.9149'	28 Oct	12:22
15	End	33° 25.6262'	155° 24.1333'	29 Oct	06:59
16	Begin	33° 17.8820'	154° 59.9990'	27 Oct	17:54
16	End	31° 21.4458'	154° 59.9997'	28 Oct	08:30
17	Begin	31° 29.3056'	154° 36.0635'	27 Oct	00:23
17	End	33° 08.6397'	154° 36.0111'	27 Oct	15:00

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Appendix A

FK151005 Cruise Science Log

The following log was kept in the science lab during the cruise and records positions and events

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
278	10/5/15	18:00:00	0	206.9	21	18.8640	N	157	52.6740	W			At dock; casting off
278	10/5/15	19:00:00	0.5	var	21	16.0450	N	157	54.4200	W			calibration offshore
278	10/5/15	21:00:00	5.7	231.9	21	16.4330	N	157	54.3254	W	233		leaving calibration site
278	10/5/15	22:00:00	12.5	266.3	21	14.9050	N	157	6.0232	W	468		transiting south of Oahu
													transiting south of Oahu; MB off with network problems
279	10/6/15	0:02:00	12.1	272.2	21	14.4114	N	158	30.3122	W			still working on MB
279	10/6/15	1:00:00	11.6	277	21	15.2130	N	158	42.3490	W			still working on MB
279	10/6/15	2:00:00	11.3	275	21	16.5180	N	158	54.6290	W			MB making progress
279	10/6/15	3:00:00	12	276	21	17.7980	N	158	6.7210	W			transit MB only
279	10/6/15	4:00:00	11.7	265	21	17.7120	N	159	19.2980	W	3668		transit MB only
279	10/6/15	5:00:00	11.5	268.3	21	16.9080	N	159	31.8500	W	3970		transit MB only
279	10/6/15	6:00:00	12.1	266	21	16.0590	N	159	45.1943	W	4156		transit MB only
279	10/6/15	7:00:00	12.1	265.34	21	15.1975	N	159	58.5484	W	4587		transit MB only
279	10/6/15	8:00:00	12.7	266.13	21	14.3800	N	160	11.5858	W	4604.17		transit MB only
279	10/6/15	9:00:00	13.2	266.65	21	13.5268	N	160	24.8424	W	4482.41		transit MB only
279	10/6/15	10:00:00	12.4	266.29	21	12.6297	N	160	38.9871	W	4397.5		transit MB only
279	10/6/15	11:00:00	12.4	270.85	21	11.8589	N	160	50.9334	W	4344.21		transit MB only
279	10/6/15	12:00:00	12.3	268.72	21	10.9931	N	161	4.5755	W	4547.54		transit MB only
279	10/6/15	13:00:00	12.5	280	21	12.7500	N	161	17.9500	W	4594		transit MB only
279	10/6/15	14:00:00	11.8	281.5	21	14.7430	N	161	30.0000	W	4583		transit MB only
279	10/6/15	15:00:00	12	280.3	21	16.8160	N	161	42.6500	W	4580		transit MB only
279	10/6/15	16:00:00	12	284	21	18.9190	N	161	55.3500	W	4596		transit MB only
279	10/6/15	17:00:00	12.1	274.24	21	20.8241	N	162	6.9439	W	4602		transit MB only
279	10/6/15	18:00:00	11.6	285.6	21	22.8471	N	162	19.2105	W	3215		transit MB only
279	10/6/15	19:00:00	11.7	281.83	21	24.9757	N	162	32.1001	W	4652		transit MB only
279	10/6/15	20:00:00	12.7	271.97	21	27.1834	N	162	45.5707	W	4686.8		transit MB only
													deploying magnetometer; speed down for deployment
279	10/6/15	20:21:20	5.1	289.74	21	27.9002	N	162	49.7348	W	4695.69		magnetometer deployed; 280 meters of cable
279	10/6/15	20:32:56	7.8	290.47	21	28.0096	N	162	50.8750	W	4695.69		spooled out; speed up slightly
279	10/6/15	20:40:35	8.4	267.65	21	28.2224	N	162	51.9774	W	4697.95		magnetometer initialized for testing
279	10/6/15	20:56:00	9.4	285.91	21	28.6038	N	162	54.1486	W	4697.7	34750	speed up to 10 knots
279	10/6/15	21:00:00	10.1	272.18	21	28.7033	N	162	54.7926	W	4695.01	34760.37	
279	10/6/15	22:00:00	10.7	281.02	21	30.5064	N	163	6.0485	W	4715.65	34758.04	
279	10/6/15	23:00:00	10.6	274	21	32.5405	N	163	18.1357	W	4716.55	34,685.60	
280	10/6/15	0:00:00	10.5	280.3	21	34.1104	N	163	27.7120	W	4693.67	34705.38	
280	10/7/15	1:00:00	10.8	280	21	35.9470	N	163	38.9300	W	4702	34,715.09	Mag still attached
280													

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
280	10/7/15	0:00:00	10.5	280.3	21	34.1104	N	163	27.7120	W	4693.67	34,705.38	
280	10/7/15	1:00:00	10.8	280	21	35.9470	N	163	38.9300	W	4702	34,715.09	Mag still attached
280	10/7/15	2:00:00	10.3	267.13	21	37.0625	N	163	50.2200	W	4674	34,737.69	passed un-named seamount
280	10/7/15	2:30:00	10.3	277.62	21	37.4649	N	163	55.4789	W	4662	34,758.46	begin logging every 30 minutes
280	10/7/15	3:00:00	10.5	272	21	37.9414	N	164	1.0266	W	4661	34,771.99	mag attachment looks good
280	10/7/15	3:30:00	10.4	278	21	38.4283	N	164	6.7600	W	4638	34,782.60	
280	10/7/15	4:00:00	10.8	278	21	38.3760	N	164	12.3774	W	4664	34,771.27	mag attachment looks good
280	10/7/15	4:30:00	10.4	288.74	21	39.3690	N	164	17.9970	W	4682	34,766.75	mag attachment looks good
280	10/7/15	5:00:00	10.2	269.774	21	39.8618	N	164	23.9385	W	4672	34,744.33	mag attachment looks good
280	10/7/15	5:30:00	10.3	270.45	21	40.2655	N	164	28.7230	W	4688	34,714.55	mag attachment looks good
280	10/7/15	6:00:00	10.2	271.31	21	40.7279	N	164	34.2478	W	4670	34,724.26	mag attachment looks good
280	10/7/15	6:30:00	10.5	277.16	21	41.2085	N	164	34.9040	W	4686	34,683.93	mag attachment looks good
280	10/7/15	7:00:00	10.8	264.52	21	41.5644	N	164	44.2353	W	4694	34,665.71	mag attachment looks good
280	10/7/15	7:30:00	10.8	277.97	21	42.1605	N	164	51.3558	W	4735	34,626.32	mag attachment looks good
280	10/7/15	8:00:00	10.3	274.86	21	42.5777	N	164	58.3934	W	4715.69	34,667.32	mag attachment looks good
280	10/7/15	8:30:00	10.6	274.5	21	43.0787	N	165	2.3997	W	4379.45	34,632.37	mag attachment looks good
280	10/7/15	9:00:00	9.5	285.93	21	43.8587	N	165	7.2840	W	4490.07	34,550.88	mag attachment looks good
280	10/7/15	9:30:00	9.9	274.23	21	44.8783	N	165	12.1518	W	4497.84	34,594.06	mag attachment looks good
280	10/7/15	10:00:00	10.5	282.11	21	45.9297	N	165	17.1128	W	4680.7	34,631.23	mag attachment looks good
280	10/7/15	11:00	10.6	284.31	21	47.9679	N	165	26.8356	W	4635.83	34,674.29	mag attachment looks good
280	10/7/15	12:00	10	292.47	21	50.1622	N	165	37.2445	W	4598.33	34,729.98	mag attachment looks good
280	10/7/15	13:00	8.9	279.19	21	52.3805	N	165	47.8137	W	4683.89	34,743.93	mag attachment looks good
280	10/7/15	14:00	9.8	288.29	21	54.4060	N	165	57.4755	W	4616.15	34,752.23	mag attachment looks good
280	10/7/15	14:30	10.2	283	21	55.6170	N	166	3.2400	W	4612	34,782.30	mag attachment looks good
280	10/7/15	15:00:00	10.4	285	21	56.7570	N	166	8.6800	W	4576	34,774.40	mag attachment looks good
280	10/7/15	15:30:00	10.3	283	21	57.8550	N	166	13.9300	W	4619	34,782.55	mag attachment looks good
280	10/7/15	16:00:00	10.2	283	21	58.9740	N	166	19.2650	W	4652	34,752.75	mag attachment looks good
280	10/7/15	16:30:00	10.1	283	22	0.0992	N	166	24.5605	W	4686	34,765.21	mag attachment looks good
280	10/7/15	17:00:00	10.2	283	22	1.2300	N	166	29.9000	W	4704	34,789.50	mag attachment looks good
													mag attachment looks good interesting
280	10/7/15	17:30:00	10.1	281.4	22	2.3597	N	166	35.3130	W	4148	34,685.12	feature line 0061-0062
280	10/7/15	18:00:00	10.1	283.7	22	3.5060	N	166	40.7741	W	4722	34,781.97	mag attachment looks good
280	10/7/15	18:30:00	10.2	290.42	22	4.5584	N	166	45.7723	W	4732	34,809.03	mag attachment looks good
280	10/7/15	19:00:00	9.9	287.36	22	5.6329	N	166	50.9238	W	4646	34,789.17	mag attachment looks good
280	10/7/15	19:30:00	10.3	285.52	22	6.7727	N	166	56.3550	W	3911	34,866.16	mag attachment looks good
280	10/7/15	20:00:00	10.2	285.95	22	7.7568	N	167	1.0978	W	2189	34,666.57	mag attachment looks good interesting
													feature line 0064
280	10/7/15	20:30:00	9.8	280.95	22	8.9657	N	167	6.8587	W	2074.1	34,574.23	mag attachment looks good
280	10/7/15	21:00:00	10.2	282.91	22	10.0816	N	167	12.1480	W	3681.53	34,557.99	mag attachment looks good
280	10/7/15	21:30:00	10.4	290.09	22	11.2366	N	167	17.6716	W	4475.83	34,686.14	mag attachment looks good
280	10/7/15	22:00:00	10	279.28	22	12.3241	N	167	22.8228	W	4581.04	34,633.38	mag attachment ok
280	10/7/15	22:30:00	10.9	289.9	22	13.4656	N	167	28.3088	W	4582.5	34,648.51	mag attachment ok
280	10/7/15	23:00:00	10.6	287.69	22	14.6838	N	167	34.2129	W	4571.89	34,732.15	mag attachment ok
280	10/7/15	23:30	11	289.21	22	15.7591	N	167	39.2620	W	4555	34,732.66	MAG ATTACHMENT OK

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
281	10/8/15	0:00:00	11.2	278.62	22	16.9780	N	167	45.0916	W	4539.79	34,704.16	MAG ATTACHMENT OK
281	10/8/15	0:30:00	10.2	282.97	22	18.1980	N	167	50.8888	W	4504	34,695.16	MAG ATTACHMENT OK
281	10/8/15	1:00:00	10.6	288.48	22	19.3642	N	167	56.4343	W	4501.36	34,790.53	MAG ATTACHMENT OK
281	10/8/15	1:30:00	10.8	281.45	22	20.5961	N	168	1.9066	W	4327.04	34,809.40	MAG ATTACHMENT OK
281	10/8/15	2:00	10.4	284.82	22	21.5961	N	168	7.1134	W	3631.9	34,694.69	MAG ATTACHMENT OK
281	10/8/15	2:30:00	10.9	285.67	22	22.8350	N	168	13.0150	W	4558	34,703.00	MAG ATTACHMENT OK
281	10/8/15	3:00:00	11.1	283	22	24.0570	N	168	18.8900	W	4360	34,640.50	MAG ATTACHMENT OK
281	10/8/15	3:30:00	11	284	22	25.2750	N	168	24.6900	W	4697	34,774.50	MAG ATTACHMENT OK
281	10/8/15	4:00:00	11.1	281	22	26.5104	N	168	30.6062	W	4699	34,771.25	MAG ATTACHMENT OK
281	10/8/15	4:30:00	11.1	283	22	27.7239	N	168	36.3934	W	4691	34,800.40	features line 72 / Mag OK
281	10/8/15	5:00:00	11.4	282.11	22	28.9103	N	168	42.0490	W	4610	34,798.76	MAG ATTACHMENT OK
281	10/8/15	5:30:00	11.2	277.63	22	30.2032	N	168	48.2414	W	4661	34,796.40	MAG ATTACHMENT OK
281	10/8/15	6:00:00	11.3	284.16	22	31.3896	N	168	53.9259	W	4655	34,826.14	MAG ATTACHMENT OK
281	10/8/15	6:30:00	11.2	292.7	22	32.6024	N	168	59.6955	W	4664	34,780.89	MAG ATTACHMENT OK
281	10/8/15	7:00:00	10.8	277.92	22	33.8315	N	169	5.6565	W	4674	34,763.82	MAG ATTACHMENT OK
281	10/8/15	7:30:00	11.2	282.92	22	35.0047	N	169	11.4572	W	4677	34,791.54	MAG ATTACHMENT OK
281	10/8/15	8:00:00	11.1	281.57	22	36.2040	N	169	16.9728	W	4685	34,785.40	MAG ATTACHMENT OK
281	10/8/15	8:30:00	11.2	275.68	22	37.4769	N	169	23.0827	W	4695.27	34,843.37	MAG ATTACHMENT OK
281	10/8/15	9:00:00	11.5	284.22	22	38.7499	N	169	29.1322	W	4700.97	34,794.79	MAG ATTACHMENT OK
281	10/8/15	9:30:00	11.7	280.5	22	40.0610	N	169	35.6143	W	4358.09	34,715.05	MAG ATTACHMENT OK
281	10/8/15	10:00:00	11.4	289.51	22	41.0375	N	169	40.6400	W	4713.41	34,876.60	MAG ATTACHMENT OK
281	10/8/15	10:30:00	12.4	283.11	22	42.2501	N	169	46.9718	W	4693.49	34,846.30	MAG ATTACHMENT OK
281	10/8/15	11:00:00	11.6	285.4	22	43.4843	N	169	53.2803	W	4687.51	34,896.11	MAG ATTACHMENT OK
281	10/8/15	11:30:00	11.6	293.95	22	44.6190	N	169	59.1281	W	4689.01	34,881.88	MAG ATTACHMENT OK
281	10/8/15	12:00:00	11.9	300.18	22	46.1003	N	170	4.8773	W	4694.09	34,883.55	MAG ATTACHMENT OK
281	10/8/15	12:30:00	11.1	298.8	22	48.3779	N	170	10.3343	W	4661.13	34,825.07	MAG ATTACHMENT OK
281	10/8/15	13:00:00	11.5	275.74	22	50.5580	N	170	15.7795	W	4692.86	34,878.54	MAG ATTACHMENT OK
281	10/8/15	13:30:00	11.6	290.6	22	52.2961	N	170	22.0084	W	4691.83	34,903.39	MAG ATTACHMENT OK
281	10/8/15	14:00:00	11.3	285	22	54.0290	N	170	28.2850	W	4711	34,922.90	MAG ATTACHMENT OK
281	10/8/15	14:30:00	10.8	287	22	55.6700	N	170	34.2390	W	4721	34,892.30	MAG ATTACHMENT OK
281	10/8/15	15:00:00	11.1	286	22	57.1832	N	170	39.7029	W	4726	34,881.80	MAG ATTACHMENT OK
281	10/8/15	15:30:00	11.1	285	22	58.7800	N	170	45.4385	W	4726	34,877.50	MAG ATTACHMENT OK
281	10/8/15	16:00:00	11.1	289	23	0.3995	N	170	51.3940	W	4738	34,902.89	MAG ATTACHMENT OK
281	10/8/15	16:30:00	10.9	287	23	1.9553	N	170	56.9127	W	4737	34,860.00	MAG ATTACHMENT OK
281	10/8/15	17:00:00	11	288	23	3.5446	N	171	2.6688	W	4745	34,865.12	MAG ATTACHMENT OK
281	10/8/15	17:30:00	11.2	282.23	23	5.0892	N	171	8.2476	W	4755	34,906.37	MAG ATTACHMENT OK
281	10/8/15	18:00:00	11	284.51	23	6.6146	N	171	13.7794	W	4768	34,905.23	MAG ATTACHMENT OK
281	10/8/15	18:30:00	11.1	290.25	23	8.1970	N	171	19.5277	W	4777	34,891.61	MAG ATTACHMENT OK
281	10/8/15	19:00:00	11.1	293.5	23	9.7663	N	171	25.2667	W	4789	34,908.50	MAG ATTACHMENT OK
281	10/8/15	19:30:00	10.8	284.6	23	11.3220	N	171	30.8400	W	4798	34,917.09	MAG ATTACHMENT OK
281	10/8/15	20:00:00	10.9	287.12	23	12.8378	N	171	36.3940	W	4801	34,950.19	MAG ATTACHMENT OK
281	10/8/15	20:30:00	11.5	289.09	23	14.6089	N	171	42.7632	W	4800.25	34,975.63	MAG ATTACHMENT OK
281	10/8/15	21:00:00	11.1	280.04	23	16.1273	N	171	45.2727	W	4804.9	34,942.85	MAG ATTACHMENT OK
281	10/8/15	21:30:00	10.6	284.09	23	17.7040	N	171	53.9771	W	4811.89	34,855.85	MAG ATTACHMENT OK
281	10/8/15	22:00:00	10.9	285.29	23	19.2651	N	171	59.6469	W	4808.03	34,827.95	MAG ATTACHMENT OK
281	10/8/15	22:30:00	11.1	288.99	23	21.0080	N	172	5.9671	W	4798.16	34,886.15	MAG ATTACHMENT OK
281	10/8/15	23:00:00	10.7	287.52	23	22.4955	N	172	11.3483	W	4783.6	34,895.15	MAG ATTACHMENT OK
281	10/8/15	23:30:00	10.7	280.84	23	23.9583	N	172	16.6561	W	4767.63	34,856.60	MAG ATTACHMENT OK

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
282	10/9/15	0:00:00	10.8	289.4	23	25.4289	N	172	22.0599	W	4756.17	34,844.15	MAG ATTACHMENT OK; Magnetic storm reported on
282	10/9/15	0:30:00	10.3	292.75	23	26.9662	N	172	27.5755	W	3994.06	34,815.98	MAG OK
282	10/9/15	1:00:00	11.2	285.08	23	28.5946	N	172	33.4763	W	1642.25	35,000.99	MAG OK
282	10/9/15	1:30:00	10.8	302.76	23	31.0246	N	172	38.0902	W	2271.63	34,929.34	MAG OK
282	10/9/15	2:00:00	10.5	300.485	23	34.4894	N	172	43.0953	W	4237.15	34,853.09	anomaly line 94 - mag OK
282	10/9/15	2:30:00	10.8	308	23	37.7030	N	172	47.6320	W	4838	35,015.85	MAG OK
282	10/9/15	3:00:00	10.4	306	23	40.8743	N	172	52.1928	W	4581	35,150.59	MAG OK
282	10/9/15	3:30:00	10.6	308	23	44.0244	N	172	56.7229	W	4404	35,194.65	MAG OK
282	10/9/15	4:00:00	9.8	308	23	47.0900	N	173	1.1080	W	4261	35,149.25	MAG OK
282	10/9/15	4:30:00	10.3	309	23	50.2730	N	173	5.6790	W	4234	35,391.76	MAG OK
282	10/9/15	5:00:00	10.5	305	23	53.5110	N	173	10.3230	W	4294	35,202.39	MAG OK
282	10/9/15	5:30:00	10.7	308.82	23	56.5848	N	173	14.7258	W	4122	35,202.21	MAG OK
282	10/9/15	6:00:00	10.1	297.36	23	59.7003	N	173	18.2074	W	4611	35,066.02	MAG OK
282	10/9/15	6:30:00	10.7	312.12	24	2.9604	N	173	23.9115	W	4865	35,069.97	MAG ATTACHMENT OK
282	10/9/15	7:00:00	10.8	304.5	24	6.0617	N	173	28.3635	W	4895	35,100.66	MAG ATTACHMENT OK
282	10/9/15	7:30:00	10.4	309.72	24	9.1476	N	173	32.8180	W	4915	35,183.47	MAG ATTACHMENT OK
282	10/9/15	8:00:00	10.3	307.9	24	12.3050	N	173	37.3498	W	4958	35,268.60	MAG OK
282	10/9/15	8:30:00	10	303.27	24	15.7088	N	173	42.2470	W	4578.19	35,494.40	MAG OK
282	10/9/15	9:00:00	10.7	304.9	24	18.7528	N	173	46.7112	W	1582.96	34,901.31	MAG OK
282	10/9/15	9:30:00	11.5	280.72	24	20.0864	N	173	52.6245	W	4246.97	35,094.97	MAG OK
282	10/9/15	10:00:00	11.3	288.55	24	21.0591	N	173	58.5242	W	5031.06	35,341.22	MAG OK
282	10/9/15	10:30:00	11.4	283.11	24	22.0070	N	174	4.4027	W	5054.83	35,348.39	MAG OK
282	10/9/15	11:00:00	11.5	283.6	24	23.0098	N	174	10.4166	W	5063.66	35,219.07	MAG OK
282	10/9/15	11:30:00	11.2	281.9	24	24.0229	N	174	16.5830	W	5065.31	35,184.06	MAG OK
282	10/9/15	12:00:00	11.5	277.33	24	25.0023	N	174	22.5237	W	5065.43	35,227.70	MAG OK
282	10/9/15	13:00:00	10.9	276.76	24	26.0514	N	174	28.9296	W	5055.35	35,256.93	MAG OK
282	10/9/15	13:30:00	11.6	277.03	24	27.0365	N	174	34.9062	W	5043.17	35,086.39	MAG OK
282	10/9/15	14:00:00	11.3	275.92	24	28.9998	N	174	46.8594	W	5054.85	35,031.57	MAG OK
282	10/9/15	14:30:00	11.5	279.47	24	30.0280	N	174	53.0891	W	5053.71	35,140.43	MAG OK
282	10/9/15	15:00:00	10.9	279	24	30.9568	N	174	58.7178	W	5077	35,255.11	MAG OK
282	10/9/15	15:30:00	10.9	281	24	31.8995	N	175	4.4063	W	5070	35,274.78	MAG OK
282	10/9/15	16:00:00	11	275.77	24	32.8942	N	175	10.5236	W	5063	35,271.39	MAG OK
282	10/9/15	16:30:00	10.8	281	24	33.8382	N	175	16.2378	W	5064	35,240.24	MAG OK
282	10/9/15	17:00:00	10.4	280	24	35.2760	N	175	22.3576	W	5088	35,257.47	MAG OK
282	10/9/15	17:30:00	10.3	281.36	24	35.7010	N	175	27.5770	W	5127	35,303.39	MAG OK
282	10/9/15	18:00:00	10.6	290.86	24	36.8930	N	175	33.4690	W	5105	35,373.92	MAG OK
282	10/9/15	18:30:00	10.7	291.2	24	38.7330	N	175	38.7270	W	5124	35,365.18	MAG ATTACHMENT OK Potential magnetic storm
282	10/9/15	19:00:00	10.8	289.9	24	40.6460	N	175	44.0830	W	5155	35,383.09	MAG OK
282	10/9/15	19:30:00	11	290.6	24	42.5090	N	175	49.3070	W	5168	35,349.36	MAG OK
282	10/9/15	20:00:00	10.9	295.08	24	44.5630	N	175	55.0760	W	5195	35,457.97	MAG OK
282	10/9/15	20:30:00	10.3	294.11	24	46.5354	N	176	0.6355	W	5203.43	35,532.02	MAG OK
282	10/9/15	21:00:00	9.9	291.42	24	48.7090	N	176	6.7300	W	5216.75	35,387.81	MAG OK
282	10/9/15	21:30:00	9.7	292.6	24	50.1425	N	176	10.7351	W	5225.94	35,307.73	MAG OK
282	10/9/15	22:00:00	9.9	292.44	24	52.2143	N	176	15.2657	W	5137.96	35,348.80	mag good
282	10/9/15	22:30:00	10	290.67	24	53.6863	N	176	20.6969	W	5188.64	35,352.57	mag good
282	10/9/15	23:00:00	9.5	294.6	24	55.4061	N	176	25.6721	W	5212.27	35,329.72	mag good
282	10/9/15	23:30:00	9.7	291.88	24	57.2602	N	176	30.7521	W	5201.32	35,369.88	MAG ATTACHMENT OK

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
283	10/10/15	0:00:00	10	294.34	24	59.0870	N	176	35.8785	W	5163	35,375.94	MAG ATTACHMENT OK
283	10/10/15	0:30:00	10.1	289.17	25	0.8737	N	176	40.9414	W	5241	35,360.17	MAG ATTACHMENT OK
283	10/10/15	1:00:00	10.1	291.15	25	2.7616	N	176	46.2111	W	5245.14	35,369.77	MAG ATTACHMENT OK
283	10/10/15	1:30:00	10	287.39	25	4.6061	N	176	51.3988	W	5246.17	35,430.76	MAG ATTACHMENT OK
283	10/10/15	2:00:00	10.1	298.05	25	6.4250	N	176	56.5039	W	5232.74	35,462.71	MAG ATTACHMENT OK
283	10/10/15	2:30:00	10	291.17	25	8.4383	N	177	2.1996	W	5154	35,484.76	MAG ATTACHMENT OK
283	10/10/15	3:00:00	9.8	280	25	9.8944	N	177	6.6634	W	3915	35,490.88	MAG ATTACHMENT OK
283	10/10/15	3:30:00	9.8	280	25	10.7344	N	177	12.0045	W	5237	35,485.97	MNT LINE 120 MAG OK
283	10/10/15	4:00:00	9.8	280	25	11.5691	N	177	17.1610	W	5237	35,497.07	MAG ATTACHMENT OK
283	10/10/15	4:30:00	10	280	25	12.4208	N	177	22.4630	W	5206	35,462.74	MAG ATTACHMENT OK
283	10/10/15	5:00:00	9.9	280	25	13.2696	N	177	27.6060	W	5163	35,449.12	MAG ATTACHMENT OK
283	10/10/15	5:30:00	10.5	282.28	25	14.1481	N	177	33.1776	W	5198	35,447.30	MAG ATTACHMENT OK
283	10/10/15	6:00:00	10.3	284.14	25	15.0584	N	177	38.8031	W	5230	35,421.31	MAG ATTACHMENT OK
283	10/10/15	6:30:00	10.2	277.29	25	15.9757	N	177	44.5061	W	5239	35,522.63	MAG ATTACHMENT OK
283	10/10/15	7:00:00	10.7	277.92	25	16.8835	N	177	50.1555	W	5320	35,466.87	MAG ATTACHMENT OK
283	10/10/15	7:30:00	10.2	281.44	25	17.8851	N	177	56.4132	W	5378	35,413.02	MAG ATTACHMENT OK
283	10/10/15	8:00:00	10.1	278.83	25	18.5663	N	178	0.6775	W	5364	35,389.37	MAG ATTACHMENT OK
283	10/10/15	8:30:00	10.2	278.51	25	19.5093	N	178	6.4872	W	5375.88	35,467.76	mag ok
283	10/10/15	9:00:00	10	280.22	25	20.4792	N	178	12.5016	W	5396.16	35,520.57	mag ok
mag ok, the mag storm wesite went down bc the internet los connection.													
283	10/10/15	9:30:00	10.1	283.21	25	21.5815	N	178	19.3886	W	5144.14	35,608.15	went down bc the internet los connection.
283	10/10/15	10:00:00	10	281.36	25	22.3386	N	178	24.0987	W	4654.81	35,496.15	mag ok
283	10/10/15	10:30:00	10.1	306.58	25	24.7512	N	178	28.3800	W	5260.9	35,551.24	mag ok
283	10/10/15	11:00:00	10.5	309.89	25	27.3372	N	178	32.1684	W	5412.89	35,580.14	mag ok
283	10/10/15	11:30:00	10.1	307	25	30.5565	N	178	36.8718	W	5465.68	35,600.59	MAG ATTACHMENT OK
283	10/10/15	12:00:00	10.3	304.63	25	33.9504	N	178	41.8737	W	5455.18	35,619.81	MAG ATTACHMENT OK
283	10/10/15	12:30:00	10.4	307.2	25	36.5827	N	178	45.7211	W	5461.14	35,634.92	MAG ATTACHMENT OK
283	10/10/15	13:00:00	9.9	303.57	25	39.6412	N	178	50.2108	W	5457.69	35,650.13	MAG ATTACHMENT OK
283	10/10/15	13:30:00	10.3	303.51	25	42.9176	N	178	55.0026	W	5453.53	35,660.28	MAG ATTACHMENT OK
283	10/10/15	14:00:00	10.1	304.81	25	46.0538	N	178	59.6173	W	5450.09	35,693.81	MAG ATTACHMENT OK
283	10/10/15	14:30:00	10.1	305	25	48.9647	N	179	3.8911	W	5452	35,700.92	MAG ATTACHMENT OK
283	10/10/15	15:00:00	10.1	309	25	52.0339	N	179	8.3948	W	5459	35,703.00	MAG ATTACHMENT OK
283	10/10/15	15:30:00	10.2	307	25	55.1229	N	179	12.9399	W	5457	35,736.33	MAG ATTACHMENT OK
283	10/10/15	16:00:00	10.6	306.2	25	58.2955	N	179	17.6091	W	5454	35,760.35	MAG ATTACHMENT OK
283	10/10/15	16:30:00	10.4	306.5	26	1.4001	N	179	22.1784	W	5442	35,779.04	MAG ATTACHMENT OK
283	10/10/15	17:00:00	10.7	308.9	26	4.5787	N	179	26.8552	W	5436	35,782.82	MAG ATTACHMENT OK
283	10/10/15	17:30:00	10.7	310.86	26	7.5889	N	179	31.2832	W	5461	35,749.49	MAG ATTACHMENT OK
283	10/10/15	18:00:00	10.6	308.01	26	10.9582	N	179	36.2590	W	5455	35,899.75	MAG ATTACHMENT OK
283	10/10/15	18:30:00	10.4	302.64	26	14.1476	N	179	40.9560	W	5148	35,874.70	MAG ATTACHMENT OK
mag ok, the mag storm wesite went down bc the internet los connection.													
283	10/10/15	19:00:00	10.1	307.26	26	17.1024	N	179	45.3150	W	3311	35,520.71	MAG ATTACHMENT OK
interesting feature line135													
283	10/10/15	19:30:00	10.1	269.25	26	17.8710	N	179	50.8593	W	4535	35,715.90	MAG ATTACHMENT OK

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
284	10/11/15	0:00:00	10.2	272.22	26	18.9078	N	179	17.1804	E	5576.91	35,767.48 mag ok	
284	10/11/15	0:30:00	10	274.63	26	18.9976	N	179	12.7360	E	5477.74	35,787.15 mag ok	
284	10/11/15	1:00:00	9.8	291.63	26	19.3895	N	179	6.9721	E	4142.24	35,807.34 mag ok	
284	10/11/15	1:30:00	10	295.55	26	21.2416	N	179	2.2208	E	5490.23	35,823.85 mag ok	
284	10/11/15	2:00:00	10	289.49	26	23.1844	N	178	57.2255	E	5636.08	35,818.02 MAG OK	
284	10/11/15	2:30:00	9.6	291.93	26	25.1853	N	178	52.0776	E	5633	35,818.17 MAG OK	
284	10/11/15	3:00:00	9.6	294.34	26	27.1283	N	178	47.0788	E	5598	35,892.48 MAG OK	
284	10/11/15	3:30:00	10.4	297.33	26	29.1250	N	178	41.9740	E	5663	35,857.20 MAG OK	
284	10/11/15	4:00:00	10.3	285.8	26	31.2297	N	178	36.5516	E	4481	35,844.72 MAG OK	
284	10/11/15	4:30:00	10.5	288.28	26	33.2087	N	178	30.8114	E	5447	35,924.02 MAG OK	
284	10/11/15	5:00:00	10.3	291.36	26	34.9219	N	178	25.7124	E	5370	35,924.53 MAG OK	
284	10/11/15	5:30:00	10.2	287.19	26	37.0870	N	178	19.2502	E	5396	35,887.36 MAG OK	
284	10/11/15	6:00:00	10.3	289.9	26	38.8322	N	178	14.3246	E	5326	36,014.65 MAG OK	
284	10/11/15	6:30:00	10.4	291.95	26	40.3282	N	178	9.6688	E	5309	36,025.34 MAG OK	
284	10/11/15	7:00:00	10.1	289.35	26	42.0910	N	178	4.4139	E	5397	35,903.73 MAG OK	
284	10/11/15	7:30:00	10.1	288.12	26	43.8918	N	177	59.0244	E	5326	35,913.03 MAG OK	
284	10/11/15	8:00:00	9.7	293.3	26	45.5764	N	177	54.1438	E	5178	36,007.06 MAG OK	
284	10/11/15	8:30:00	10.2	292.92	26	48.1771	N	177	46.6746	E	5417.48	36,112.04 mag ok	
284	10/11/15	9:00:00	10.6	291.02	26	49.6145	N	177	42.5837	E	5340.27	36,131.68 mag ok	
284	10/11/15	9:30:00	10.3	292.66	26	51.4218	N	177	37.4200	E	5366.89	36,114.92 mag ok	
284	10/11/15	10:00:00	10.3	295.33	26	52.9426	N	177	33.0466	E	5512.6	36,053.75 mag ok	
284	10/11/15	10:30:00	10.1	290.96	26	54.7340	N	177	27.9391	E	5414.59	36,016.59 mag ok	
284	10/11/15	11:00:00	10.1	288.78	26	56.7718	N	177	22.0929	E	5097.55	36,049.66 mag ok	
284	10/11/15	11:30:00	10.4	285.5	26	59.4346	N	177	14.2030	E	3948.81	36,074.59 mag ok	
284	10/11/15	12:00:00	10.4	288.77	27	0.3073	N	177	11.5041	E	5058.75	36,055.44 mag ok	
284	10/11/15	12:30:00	9.6	291.77	27	1.9375	N	177	6.3612	E	5641.83	36,056.51 mag ok	
284	10/11/15	13:00:00	10	291.42	27	3.5678	N	177	1.1984	E	5592.92	36,073.41 mag ok	
284	10/11/15	13:30:00	10.5	289.03	27	5.3361	N	176	55.6401	E	5555.52	36,178.52 mag ok	
284	10/11/15	14:00:00	10	295.49	27	6.9697	N	176	50.5500	E	5492.96	36,289.26 mag ok	
284	10/11/15	14:30:00	9.9	289.05	27	8.7610	N	176	44.8441	E	5517.36	36,244.20 mag ok	
284	10/11/15	15:00:00	10	289.2	27	10.3983	N	176	39.7237	E	5546	36,124.38 MAG OK	
284	10/11/15	15:30:00	10.5	296.69	27	12.4545	N	176	34.8446	E	5710	36,098.77 mnt line 20 mag ok	
284	10/11/15	16:00:00	10.5	297.19	27	14.7704	N	176	29.7624	E	5652	36,128.10 mag ok	
284	10/11/15	16:30:00	9.8	294.84	27	17.0723	N	176	24.7064	E	5704	36,145.77 mag ok	
284	10/11/15	17:00:00	10.1	295.25	27	19.2765	N	176	19.8741	E	5692	36,178.85 mag ok	
284	10/11/15	17:30:00	10.1	299.41	27	21.6308	N	176	14.6814	E	5648	36,238.16 mag ok	
284	10/11/15	18:00:00	9.9	300.2	27	27.8598	N	176	9.8061	E	5642	36,323.29 mag ok	
284	10/11/15	18:30:00	10.2	297.7	27	26.2928	N	176	4.6770	E	5609	36,444.31 mag ok	
													mag ok at 18:16 GMT multibeam
													adjusted 2 degrees pointed
													forward to avoid high intensity
284	10/11/15	19:00:00	9.8	295.59	27	28.2369	N	176	0.1789	E	5659		
284	10/11/15	19:30:00	9.9	294.78	27	30.4578	N	175	55.2826	E	5666	36,497.86 tracks	
												36,516.85 mag ok	

284	10/11/15	20:00:00	10.2	282.46	27	32.6243	N	175	50.2443	E	5698	36,470.99	mag ok
284	10/11/15	20:30:00	10.3	287.97	27	34.1279	N	175	44.6970	E	5603	36,413.16	mag ok
284	10/11/15	21:00:00	10.3	288	27	35.6973	N	175	39.0254	E	5595	36,421.77	mag ok
284	10/11/15	21:30:00	10.3	285.48	27	37.2261	N	175	33.5099	E	5606.93	36,307.55	mag ok
284	10/11/15	22:00:00	10.1	293.13	27	38.6693	N	175	28.2518	E	5643.01	36,246.36	mag ok
284	10/11/15	22:30:00	10.1	288.42	27	40.2512	N	175	22.5426	E	5701.27	36,338.41	mag ok
284	10/11/15	23:00:00	10.1	289.4	27	41.8137	N	175	16.8813	E	5707.08	36,369.75	mag ok
284	10/11/15	23:30:00	10.4	288.02	27	43.2433	N	175	11.7091	E	5786.83	36,518.22	mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
285	10/12/15	0:00:00	10.8	287.65	27	44.8816	N	175	5.7040	E	5799.62	36,605.80 mag ok	
285	10/12/15	0:30:00	10.5	291.18	27	46.4319	N	175	0.1405	E	5889.56	36,614.25 mag ok	
285	10/12/15	1:00:00	10.1	292.8	27	47.8705	N	174	54.9399	E	5919.31	36,604.99 mag ok	
285	10/12/15	1:30:00	10.4	290.35	27	49.4279	N	174	49.2796	E	5884.91	36,569.52 mag ok	
285	10/12/15	2:00:00	10	293.68	27	50.8841	N	174	43.9900	E	5898.96	36,504.50 mag ok	
285	10/12/15	2:30:00	10	284.84	27	52.3767	N	174	38.5761	E	5945.65	36,536.62 mag ok	
285	10/12/15	3:00:00	10.6	294.43	27	54.2583	N	174	32.7505	E	5971.82	36,540.53 MAG OK	
285	10/12/15	3:30:00	10.3	286.48	27	56.0977	N	174	27.9902	E	5951	36,451.57 MAG OK	
285	10/12/15	4:00:00	10	291.44	27	58.0629	N	174	22.8960	E	5963	36,412.59 mag ok	
285	10/12/15	4:30:00	10.4	302.84	28	0.0687	N	174	17.6597	E	5025	36,489.62 MAG OK	
285	10/12/15	5:00:00	10.3	291.4	28	2.0846	N	174	12.3962	E	5979	36,613.95 MAG OK	
285	10/12/15	5:30:00	10.1	287.53	28	4.1295	N	174	7.0981	E	5950	36,646.47 MAG OK	
285	10/12/15	6:00:00	10.1	293.1	28	6.1173	N	174	1.8952	E	5920	35,587.78 MAG OK	
285	10/12/15	6:30:00	10.1	294.5	28	8.0489	N	173	56.8560	E	5919	36,591.33 MAG OK	
285	10/12/15	7:00:00	10.9	300.81	28	10.1127	N	173	51.5316	E	5953	36,689.40 MAG OK	
285	10/12/15	7:30:00	10.1	292.83	28	12.1780	N	173	46.1450	E	5902	36,805.04 MAG OK	
285	10/12/15	8:00:00	10.4	281.43	28	14.7330	N	173	39.4771	E	5868	36,846.44 MAG OK	
285	10/12/15	8:30:00	10.6	290.91	28	16.1636	N	173	35.7433	E	5893	36,831.28 MAG OK	
285	10/12/15	9:00:00	10.7	300.43	28	18.0622	N	173	30.7941	E	5920	36,779.66 MAG OK	
285	10/12/15	9:30:00	10.1	285.22	28	20.6239	N	173	24.0758	E	5813.34	36,685.96 MAG OK	
285	10/12/15	10:00:00	10	293.06	28	22.5905	N	173	18.9698	E	5817.2	36,790.04 mag ok	
285	10/12/15	10:30:00	9.7	294.28	28	24.1312	N	173	14.9533	E	5782.65	36,878.65 MAG OK	
285	10/12/15	11:00:00	10.2	291.46	28	26.2427	N	173	9.4275	E	5737.75	36,942.61 MAG OK	
285	10/12/15	11:30:00	10	291.23	28	28.1564	N	173	4.4110	E	5687.63	36,933.69 mag ok	
285	10/12/15	12:00:00	10.7	292.57	28	30.2501	N	172	58.9449	E	5728.19	36,936.00 mag ok	
285	10/12/15	12:30:00	10.7	303.25	28	32.1019	N	172	54.1296	E	5818.67	36,960.50 mag ok	
285	10/12/15	13:00:00	10.1	288.79	28	34.2871	N	172	48.4052	E	5880.98	36,995.02 mag ok	
285	10/12/15	13:30:00	10	296.64	28	36.5518	N	172	42.4931	E	5904.2	37,066.10 mag ok	
285	10/12/15	14:00:00	10.5	298.8	28	38.3166	N	172	37.8706	E	5729.99	37,177.58 MAG OK	
285	10/12/15	14:30:00	9.8	300.19	28	40.1971	N	172	32.9591	E	5625.36	37,161.95 MAG OK	
285	10/12/15	15:00:00	9.4	295.81	28	42.3089	N	172	27.4163	E	5596.82	37,156.63 MAG OK	
285	10/12/15	15:30:00	9.8	293.24	28	44.1721	N	172	22.5236	E	5777	37,142.13 mag ok	
285	10/12/15	16:00:00	9.8	293	28	46.1405	N	172	17.3732	E	5867	37,124.97 MAG OK	
285	10/12/15	16:30:00	9.9	294	28	48.0693	N	172	12.2955	E	5893	37,111.75 MAG OK	
285	10/12/15	17:00:00	10.5	293.91	28	50.0502	N	172	7.1345	E	5831	37,083.42 mag ok	
285	10/12/15	17:30:00	10	296.73	28	52.0311	N	172	1.9277	E	5818	37,046.46 MAG OK	
285	10/12/15	18:00:00	10	291.25	28	54.0191	N	171	56.7236	E	5789	37,043.65 MAG OK	
285	10/12/15	18:30:00	10.9	296.85	28	55.8930	N	171	51.8358	E	5731	37,112.18 MAG OK	
285	10/12/15	19:00:00	10.3	293.92	28	58.0360	N	171	46.1806	E	5669	37,104.18 MAG OK	
285	10/12/15	19:30:00	9.9	290.83	28	58.8529	N	171	41.3782	E	5502	37,015.28 MAG OK	
285	10/12/15	20:00:00	9.9	293.88	29	2.0111	N	171	35.7144	E	3162	36,615.50 MAG OK	
285	10/12/15	20:30:00	9.6	297.14	29	4.2173	N	171	30.4660	E	2747	36,549.67 MAG OK	
285	10/12/15	21:00:00	9.5	302.03	29	6.5835	N	171	24.8577	E	5324	36,960.59 MAG OK	

285	10/12/15	21:30:00	9.5	293.1	29	9.0149	N	171	19.2953	E	5824.87	37,108.12	MAG OK
285	10/12/15	22:00:00	10	298.72	29	11.2123	N	171	14.2412	E	5851.64	37,104.55	mag ok
285	10/12/15	22:30:00	10.5	291.99	29	13.3700	N	171	9.3232	E	5879.81	37,170.63	MAG OK
285	10/12/15	23:00:00	10.6	293.06	29	15.6985	N	171	4.0085	E	5408.52	37,230.32	MAG OK
285	10/12/15	23:30:00	10.1	294.99	29	17.9649	N	170	58.8229	E	5646	37,224.66	MAG OK

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
286	10/13/15	0:00:00	10.2	296.85	29	20.2262	N	170	53.6422	E	5650.12	37,244.17	MAG OK
286	10/13/15	0:30:00	10.6	293.99	29	22.6777	N	170	48.0435	E	5638.88	37,297.34	mag ok
286	10/13/15	1:00:00	10.7	294.65	29	24.7660	N	170	43.2324	E	5637.41	37,324.69	mag ok
286	10/13/15	1:30:00	10.1	297.97	29	27.1384	N	170	37.8101	E	5658.99	37,317.80	mag ok
286	10/13/15	2:00:00	10.1	294.91	29	29.4843	N	170	32.4496	E	5613.25	37,336.62	mag ok
286	10/13/15	2:30:00	10.5	298	29	31.7552	N	170	27.2411	E	5546.48	37,413.68	MAG OK
286	10/13/15	3:00:00	10.3	297.23	29	34.1626	N	170	21.7152	E	5594	37,564.85	MAG OK
286	10/13/15	3:30:00	11	299.77	29	36.5146	N	170	16.2833	E	5560	37,691.24	MAG OK
286	10/13/15	4:00:00	10.5	297.33	29	38.8858	N	170	10.8713	E	5570	37,692.00	MAG OK
286	10/13/15	4:30:00	10.2	301.1	29	41.2400	N	170	5.4614	E	5606	37,637.78	MAG OK
286	10/13/15	5:00:00	10.5	296.17	29	43.5869	N	170	0.0521	E	5630	37,515.19	MAG OK
MAG OK, LINE COUNT INCREASED													
								5653					FROM 57 TO 58 AT 5:00:00 WHEN
MB FORWARD TILT INCREASED													
286	10/13/15	5:30:00	10.3	307.97	29	46.2485	N	169	54.7026	E		37,431.74	FROM 2 DEGREES TO 3 DEGREES
286	10/13/15	6:00:00	10.5	307.88	29	49.2665	N	169	49.8342	E	5660	37,424.80	MAG OK
286	10/13/15	6:30:00	10	301.81	29	53.1553	N	169	43.5360	E	5684	37,450.05	MAG OK
286	10/13/15	7:00:00	10.7	299.98	29	55.1548	N	169	40.2753	E	5675	37,470.29	MAG OK
286	10/13/15	7:30:00	10.1	299.89	29	58.0300	N	169	35.6118	E	5701	37,514.31	MAG OK
286	10/13/15	8:00:00	10.3	305.6	30	1.1427	N	169	30.5798	E	5731	37,561.67	MAG OK
286	10/13/15	8:30:00	10.3	299.66	30	3.9620	N	169	26.0049	E	5736	37,598.17	MAG OK
286	10/13/15	9:00:00	10.1	307.13	30	7.3390	N	169	20.5196	E	5722.07	37,626.23	MAG OK
286	10/13/15	9:30:00	10.2	302.38	30	9.9433	N	169	16.2939	E	5768.61	37,648.29	mag ok
286	10/13/15	10:00:00	10.4	302.39	30	12.9111	N	169	11.4821	E	5821.29	37,648.22	mag ok
286	10/13/15	10:30:00	10.4	301.06	30	17.0425	N	169	4.7502	E	5865.27	37,674.05	mag ok
286	10/13/15	11:00:00	10.1	310.66	30	19.4711	N	169	0.8065	E	5485.27	37,713.58	mag ok
286	10/13/15	11:30:00	9.8	305.49	30	21.8363	N	168	56.9542	E	5800.07	37,722.05	mag ok
286	10/13/15	12:00:00	10.2	303.22	30	24.7555	N	168	52.2090	E	5795.87	37,739.91	mag ok
286	10/13/15	12:30:00	10	306.07	30	28.0044	N	168	46.9106	E	5829.54	37,777.03	MAG OK
286	10/13/15	13:00:00	10.1	301.5	30	30.8051	N	168	42.3530	E	5708.73	37,827.10	MAG OK
286	10/13/15	13:30:00	10.8	301.8	30	33.8675	N	168	37.3509	E	5658.02	37,885.45	MAG OK
286	10/13/15	14:00:00	11	309.47	30	36.8441	N	168	32.5207	E	5844.19	37,926.87	MAG OK
286	10/13/15	14:30:00	10.7	306.23	30	39.7783	N	168	27.6948	E	5789.38	37,977.80	MAG OK
286	10/13/15	15:00:00	10.9	304.86	30	42.8014	N	168	22.8032	E	5815.93	38,019.19	MAG OK
286	10/13/15	15:30:00	10.3	304.68	30	45.8841	N	168	17.7613	E	5743	38,099.51	MAG OK
286	10/13/15	16:00:00	10.2	299.66	30	48.7619	N	168	13.0483	E	5872	38,127.55	MAG OK, SEABUMP ON LINE 69
286	10/13/15	16:30:00	10	302.86	30	51.6870	N	168	8.2783	E	5781	38,153.41	MAG OK
286	10/13/15	17:00:00	10.2	300.56	30	54.6080	N	168	3.4920	E	5777	38,196.01	MAG OK
286	10/13/15	17:30:00	10	300.1	30	57.5218	N	167	58.7015	E	5770	38,218.45	MAG OK
286	10/13/15	18:00:00	10	297.98	31	0.2933	N	167	54.1880	E	5958	38,246.39	MAG OK
286	10/13/15	18:30:00	10.1	0.1262	31	3.1263	N	167	49.5324	E	6043	38,312.80	MAG OK
286	10/13/15	19:00:00	10	311.95	31	5.8294	N	167	45.0496	E	5761	38,382.48	MAG OK

286	10/13/15	19:30:00	10.1	299.13	31	9.1453	N	167	39.6081	E	6109	38,491.42	MAG OK
286	10/13/15	20:00:00	10	295.38	31	12.2165	N	167	34.6407	E	6000	38,586.39	MAG OK
286	10/13/15	20:30:00	10.1	303.19	31	14.7401	N	167	30.4753	E	6000	38,633.40	MAG OK
286	10/13/15	21:00:00	10.1	306.46	31	17.2040	N	167	26.4353	E	6008	38,656.93	MAG OK
286	10/13/15	21:30:00	10.3	306.27	31	20.4242	N	167	21.1562	E	6034.13	38,682.57	mag ok
286	10/13/15	21:48:00										EM302 FROZEN SCREEN	
286	10/13/15	22:05:00	10.4	302.54	31	23.9302	N	167	15.3872	E	6036.19	38,723.12	RESOLVED; mag ok
286	10/13/15	22:30:00	10.1	301.17	31	26.2449	N	167	11.5832	E	5961.29	38,738.70	mag ok
286	10/13/15	22:35:00										xbt ALARM (YELLOW BOX) em302	
286	10/13/15	23:00:00	10.1	300.38	31	29.0987	N	167	6.8727	E	5949.48	38,757.74	mag ok
286	10/13/15	23:30:00	10.4	305.77	31	32.2028	N	167	1.7911	E	5917.09	38,782.21	mag ok
												SCREEN; back2back xbt	
												measurements	

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
287	10/14/15	0:00:00	10.1	300.4	31	34.9612	N	166	57.1399	E	6080.08	38,784.26 mag OK	
287	10/14/15	0:30:00	9.9	301.59	31	38.5967	N	166	51.2408	E	6146.37	38,756.44 mag OK	
287	10/14/15	1:00:00	9.9	309.71	31	40.7261	N	166	47.7108	E	6285.74	38,840.88 MAG OK	
287	10/14/15	1:30:00	9.9	306.71	31	43.6590	N	166	42.8940	E	6155.49	38,969.44 MAG OK	
287	10/14/15	2:00:00	9.5	315.45	31	46.4409	N	166	38.2515	E	6121.27	38,985.07 MAG OK	
287	10/14/15	2:30:00	10	313.18	31	49.4089	N	166	33.3581	E	6130.03	39,003.69 MAG OK	
287	10/14/15	3:00:00	10.3	306.77	31	52.1022	N	166	28.9292	E	6021.26	39,009 MAG OK	
287	10/14/15	3:30:00	9.8	297.55	31	55.1596	N	166	23.8806	E	6000	38,963.36 mag OK	
287	10/14/15	4:00:00	9.8	307.67	31	57.4407	N	166	18.9321	E	6097	38,864.14 mag OK	
287	10/14/15	4:30:00	10	306.08	31	59.7050	N	166	13.7065	E	6011	38,856.64 MAG OK	
287	10/14/15	5:00:00	9.8	289.38	32	1.9046	N	166	8.6354	E	6273	38,928.22 mag OK	
287	10/14/15	5:30:00	9.7	286.54	32	4.1522	N	166	3.4601	E	6294	38,879.20 mag OK	
287	10/14/15	6:00:00	9.8	299.46	32	6.3268	N	165	58.3912	E	6009	MAG OK, DIAGONAL FEATURE ON	
287	10/14/15	6:30:00	9.8	298.4	32	8.5677	N	165	53.2501	E	6150	38,942.28 LINE 83	
287	10/14/15	7:00:00	9.9	301.89	32	10.6447	N	165	48.4647	E	6155	39,087.63 mag OK	
287	10/14/15	7:30:00	10.1	297.49	32	13.2991	N	165	42.3668	E	6165	39,170.47 mag OK	
287	10/14/15	8:00:00	10.1	292.68	32	15.8057	N	165	38.2912	E	6183	39,226.31 mag OK	
287	10/14/15	8:30:00	10.4	294.98	32	17.4627	N	165	32.7407	E	6167	39,237.24 mag OK	
287	10/14/15	9:00:00	9.9	292.94	32	19.6791	N	165	27.5921	E	6112	39,284.13 mag OK	
287	10/14/15	9:30:00	10.3	302.96	32	22.0663	N	165	22.0793	E	6153.52	39,309.73 mag OK	
287	10/14/15	10:00:00	10.3	286.87	32	24.4400	N	165	16.5199	E	6195.8	39,321.13 mag OK	
287	10/14/15	10:30:00	9.6	299.14	32	26.7159	N	165	11.3126	E	6241.23	39,357.92 mag ok	
287	10/14/15	11:00:00	10.5	298.99	32	29.0142	N	165	6.0016	E	6262.61	39,345.13 mag ok	
287	10/14/15	11:30:00	10.1	298.54	32	31.8387	N	164	59.4489	E	6244.99	39,291.90 mag ok	
287	10/14/15	12:00:00	10.3	299.1	32	33.2563	N	164	54.1452	E	6256.61	39,227.54 mag ok	
287	10/14/15	12:30:00	10.5	288.12	32	36.1978	N	164	49.3246	E	6256.61	39,341.65 MAG OK	
287	10/14/15	13:00:00	10.3	299.39	32	38.5698	N	164	43.8202	E	6263.04	39,375.62 MAG OK, depth box yellow	
287	10/14/15	13:30:00	10.3	295.2	32	40.8040	N	164	38.6653	E	6276.58	39,508.81 MAG OK, depth box yellow	
287	10/14/15	14:00:00	9.9	298.5	32	43.1111	N	164	33.2895	E	6260.21	39,592.09 MAG OK, depth box yellow	
287	10/14/15	14:30:00	10	297.75	32	45.5306	N	164	27.6918	E	6278.59	39,649.40 MAG OK, depth box yellow	
287	10/14/15	15:00:00	10.2	289.85	32	47.7838	N	164	22.4514	E	6272.42	39,673.36 MAG OK, depth box yellow	
287	10/14/15	15:30:00	10.3	302.1	32	50.3076	N	164	16.5849	E	6268.28	39,691.47 MAG OK, depth box yellow	
287	10/14/15	15:30:00	10.3	302.1	32	50.3076	N	164	16.5849	E	6260.64	39,712.74 MAG OK, depth box yellow	
287	10/14/15	16:00:00	10.5	293.21	32	52.4168	N	164	11.6645	E	6258.11	MAG OK, depth box yellow - means momentarily yellow	
287	10/14/15	16:30:00	9.9	295.3	32	54.5738	N	164	6.6571	E	6262	39,733.06 perhaps when deeper than 6250?	
287	10/14/15	17:00:00	10	299.46	32	56.7536	N	164	1.5789	E	6258	39,758.92 Mag ok, depth box yellow	
287	10/14/15	17:30:00	10	295.85	32	59.0859	N	163	56.1429	E	6250	39,786.47 Mag ok, depth box yellow	
287	10/14/15	17:30:00	10	295.85	32	59.0859	N	163	56.1429	E	6250	39,815.34 Mag ok, depth box yellow	
287	10/14/15	18:00:00	10	294.27	33	1.3656	N	163	50.8318	E	6232	mag ok, yellow box means depth w/in 10% of 7000 set limit per Leighton	
287	10/14/15	18:30:00	10.1	301.07	33	3.6447	N	163	45.5324	E	6264	39,828.44 mag ok, still yellow box	

287	10/14/15	19:00:00	9.9	297.5	33	5.9105	N	163	40.2380	E	6243	39,834.70	mag ok
287	10/14/15	19:30:00	9.8	295.25	33	8.1979	N	163	34.9287	E	6229	39,853.92	mag ok
287	10/14/15	20:00:00	9.6	295.69	33	10.2255	N	163	30.1978	E	6240.52	39,864.11	mag ok
287	10/14/15	20:30:00	9.9	292.55	33	12.5795	N	163	24.6919	E	6214	39,870.75	mag ok
287	10/14/15	21:00:00	10.4	293.96	33	14.7599	N	163	19.5985	E	6242	39,854.77	mag ok
287	10/14/15	21:30:00	10.4	302.44	33	17.0539	N	163	14.2437	E	6214	39,810.94	mag ok
287	10/14/15	22:00:00	10	295.5	33	19.4318	N	163	8.6648	E	6169	39,785.91	mag ok
287	10/14/15	22:30:00	9.6	286.88	33	21.4334	N	163	4.0655	E	6202.93	39,814.19	mag ok
287	10/14/15	23:00:00	10.1	296.55	33	23.7672	N	162	58.5193	E	6229.91	39,860.26	mag ok
287	10/14/14	23:30:00	10.5	297.29	33	26.2377	N	162	52.6652	E	6195.41	39,990.39	mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
288	10/15/15	0:00:00	10.1	297.79	33	28.4818	N	162	47.4673	E	6189.87	40,058.04 mag ok	
288	10/15/15	0:30:00	9.3	303.99	33	30.7579	N	162	42.2844	E	5849.88	40,122.58 mag ok	
288	10/15/15	1:00:00	9.8	298.63	33	33.0424	N	162	36.7958	E	6050.84	40,230.25 mag ok	
288	10/15/15	1:30:00	9.4	315.78	33	36.9781	N	162	33.0140	E	6007.37	40,307.56 MAG OK	
288	10/15/15	2:00:00	9.9	324.04	33	40.7100	N	162	29.6399	E	5980.37	40,277.17 MAG OK	
288	10/15/15	2:30:00	9.6	320.25	33	44.7242	N	162	26.0130	E	5932.3	40,199.20 MAG OK	
288	10/15/15	3:00:00	9.8	322.58	33	48.6062	N	162	22.5161	E	5792.83	40,094.00 MAG OK	
288	10/15/15	3:30:00	9.3	323.29	33	52.1968	N	162	19.2566	E	5712.56	40,137.04 MAG OK	
288	10/15/15	4:00:00	10.6	322.03	33	55.9684	N	162	15.8319	E	5614.35	40,264.45 MAG OK	
288	10/15/15	4:30:00	10	324.43	33	59.9686	N	162	12.2209	E	5600	40,470.11 mag ok	
288	10/15/15	5:00:00	9.9	322.7	34	3.9746	N	162	8.5865	E	5650	40,480.18 mag ok	
288	10/15/15	5:30:00	10.2	320.94	34	7.9948	N	162	4.9299	E	5479	40,395.06 mag ok	
288	10/15/15	6:00:00	10.9	324.58	34	12.2406	N	162	1.0668	E	5402	40,335.48 mag ok	
288	10/15/15	6:30:00	10.8	320.01	34	16.5411	N	161	57.1703	E	5299	40,303.66 mag ok	
288	10/15/15	7:00:00	10.6	293.08	34	20.3793	N	161	53.1299	E	5210	40,574.27 mag ok	
288	10/15/15	7:30:00	10.5	294.57	34	22.5510	N	161	47.7022	E	5043	40,642.48 mag ok	
288	10/15/15	8:00:00	10.2	292.87	34	24.6812	N	161	42.2349	E	4741	40,690.47 mag ok	
288	10/15/15	8:30:00	10.7	293.98	34	27.0831	N	161	36.1930	E	4709	40,843.65 mag ok	
288	10/15/15	9:00:00	11.2	286.46	34	29.7764	N	161	29.3229	E	4684	41,013.68 mag ok	
288	10/15/15	9:30:00	10.8	293.83	34	31.6989	N	161	24.4496	E	4716	41,079.69 mag ok	
288	10/15/15	10:00:00	11.2	297.72	34	34.0141	N	161	18.5780	E	4861	41,157.93 mag ok	
288	10/15/15	10:30:00	11.7	295.44	34	36.6265	N	161	11.9168	E	3908.75	41,336.60 mag ok	stop logging and pinging multibeam;
288	10/15/15	11:01:45	7.8	307.25	34	39.8489	N	161	5.9580	E	4150	41,088.68 slow down knots/hr	
288	10/15/15	11:00:00	8.6	310.97	34	39.8591	N	161	5.9383	E	4149.76	41,087.93 mag ok	
288	10/15/15	11:03:00	8.2	306.38	34	39.8755	N	161	5.9179	E	4149.76	41,087.56 folder "Tamu Massif" Line 000	start logging and pinging multibeam - magnetometer off
288	10/15/15	11:14:00											magnetometer on @ 1.0 Hz; survey = FK151005_Tamu_Line1
288	10/15/15	11:30:00	8.2	314.55	34	41.7212	N	161	3.2554	E	4028.53	41,016.32 mag ok; loaded new xpt	
288	10/15/15	11:39:00	8.1	294.16	34	42.7148	N	161	1.7298	E	3997.59	40,938.32 starting "gradual" turn	
288	10/15/15	11:55:33	8.9	197.23	34	41.8851	N	160	59.9870	E	3967.59	40,901.62 start line 1 @ line 0001	
288	10/15/15	12:00:00	8.5	167.48	34	41.3907	N	160	59.9838	E	3962.31	40,908.70 mag ok	
288	10/15/15	12:30:00	8.3	178.5	34	37.5984	N	160	59.9960	E	4028.45	41,086.21 mag ok	
288	10/15/15	13:00:00	8.6	193.73	34	33.3349	N	160	59.9960	E	4400.01	41,347.16 mag ok	
288	10/15/15	13:30:00	8.7	185.44	34	29.0061	N	160	59.9980	E	4530.01	41,089.13 mag ok	
288	10/15/15	14:00:00	8.8	181.1	34	24.9701	N	161	0.0021	E	4566	40,915.91 mag ok	
288	10/15/15	14:30:00	8.1	184.27	34	21.1487	N	160	59.9938	E	4351.87	40,859.27 mag ok	
288	10/15/15	15:00:00	8.3	186.33	34	17.0625	N	161	0.0057	E	4123.31	40,600.59 mag ok	15:19 seafloor info system has stopped working. 200 meters of missing data.
288	10/15/15	15:30:00	8.4	179.03	34	12.9505	N	161	0.0050	E	4193.82	40,701.63 shows mag recordings at 1Hz.	Frequency of Magnetometer was set to 0.1 Hz changed back to 1 Hz, data file

288	10/15/15	16:00:00	8.7	181.98	34	8.8491	N	160	59.9986	E	4276.45	40,820.70 mag ok
288	10/15/15	16:30:00	8	179.75	34	4.9505	N	160	59.9994	E	4330	40,931.94 mag ok
288	10/15/15	17:00:00	8	178.44	34	0.9724	N	160	59.9998	E	4335	mag ok, unexplained chirping of Bosch electronics to left several times per hour (happening for several hours)
288	10/15/15	17:30:00	8	179.31	33	57.0182	N	161	0.0099	E	4518	40,869.14 hour
288	10/15/15	18:00:00	8	180.19	33	53.0183	N	161	0.0063	E	4466	40,843.27 mag ok
288	10/15/15	18:30:00	8.2	176.01	33	48.8810	N	160	59.9967	E	4548	40,790.51 mag ok
288	10/15/15	19:00:00	8.2	179.76	33	44.8337	N	161	0.0019	E	4770	40,734.72 mag ok
288	10/15/15	19:30:00	7.8	175.5300	33	40.4540	N	161	0.0042	E	3755	40,715.73 mag ok
288	10/15/15	20:00:00	7.9	181.82	33	36.8789	N	160	59.9903	E	4403	40,671.56 mag ok
288	10/15/15	20:30:00	7.4	182.48	33	32.7639	N	161	0.0017	E	5066	40,367.97 mag ok
288	10/15/15	21:00:00	7.2	183.92	33	28.8349	N	160	59.9948	E	5264	mag ok changed multi-beam ping mode setting to 'very deep' to correct sudden narrowing of crosstrack
288	10/15/15	21:30:00	8.8	183.47	33	24.8871	N	161	0.0002	E	5284	40,468.47
288	10/15/15	22:00:00	7.9	177.18	33	20.8325	N	161	0.0001	E	5192	40,606.43 mag ok
288	10/15/15	22:30:00	8.4	188.01	33	16.7251	N	161	0.0022	E	5202.96	40,594.93 mag ok
288	10/15/15	23:00:00	7.4	176.26	33	12.6806	N	160	59.9993	E	5322.16	mag ok; em302 ok; SV_used (1535.20)
288	10/15/15	23:15:00	8.3	188.2	33	10.0044	N	160	59.9340	E	5404.15	40,461.53 ok; ea600 ok; Sampling_on @ 1.0 Hz ~js
288	10/15/15	23:24:00	6.5	218.95	33	9.1053	N	160	59.4060	E	5409.53	mag ok; em302 ok; SV_used (1535.30)
288	10/15/15	23:30:00	6.3	210.39	33	8.6483	N	160	59.0367	E	5416.34	40,367.79 ok; ea600 ok; Sampling_on @ 1.0 Hz ~js
289	10/16/15	0:00:00	6.8	200.75	33	5.8239	N	160	57.0449	E	5348.54	end of line 001 (manual to 13 for turn); begin "gradual" turn; exported mag
289	10/16/15	0:30:00	6.3	211.66	33	3.0067	N	160	54.7570	E	5508.93	40,328.91 data; survey line 0 to 12 "first track"
289	10/16/15	1:00:00	7	218.91	33	0.3811	N	160	52.4239	E	5489.01	40,329.42 slowing to 6 knots per "A"
289	10/16/15	1:30:00	7.9	211.75	32	57.0777	N	160	49.3607	E	5460.55	mag ok; em302 ok; SV_used (1535.30)
289	10/16/15	2:00:00					N			E		mag ok; em302 ok; SV_used (1535.10)
289	10/16/15	2:30:00					N			E		40,359.30 ok; ea600 ok; Sampling_on @ 1.0 Hz ~js
289	10/16/15	3:00:00					N			E		mag (ea600) ok, sampling @ 1.0 Hz;
							N			E		40,370.08 em302 ok; SV_used (1535.10) ok ~js
							N			E		mag (ea600) ok, sampling @ 1.0 Hz;
							N			E		40,330.41 em302 ok; SV_used (1535.00) ok ~js
							N			E		mag (ea600) ok, sampling @ 1Hz;
							N			E		40,265.24 em302 ok, SV used (1534.6) ok -PK

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
289	10/16/15	0:00:00	6.8	200.75	33	5.8239	N	160	57.0449	E	5348.54	40.359.30	mag ok; em302 ok; SV_used (1535.10) ok; mag (ea600) ok; Sampling @ 1.0 Hz ~js
289	10/16/15	0:30:00	6.3	211.66	33	3.0067	N	160	54.7570	E	5508.93	40.370.08	mag (ea600) ok; SV_used (1535.10) ok ~js
289	10/16/15	1:00:00	7	218.91	33	0.3811	N	160	52.4239	E	5489.01	40.330.41	mag (ea600) ok; sampling @ 1.0 Hz; mag (ea600) ok; SV_used (1535.00) ok ~js
289	10/16/15	1:30:00	7.9	211.75	32	57.0777	N	160	49.3607	E	5460.55	40.265.24	mag (ea600) ok; ; em302 ok; SV used (1534.6) -PK
289	10/16/15	2:00:00	7.7	222.17	32	54.0290	N	160	46.1940	E	5365.05	40.175.85	mag (ea600) ok; em302 ok; sv used (1534.6) -PK
289	10/16/15	2:30:00	8.4	228.66	32	51.0966	N	160	43.0899	E	5280.06	40.191.00	mag (ea600) ok; em302 ok; sv used (1535) -AP
289	10/16/15	2:44:37											Created new line survey Turn001, Started FK151005_Tamu_Line_002
289	10/16/15	3:00:00	8.5	225.56	32	48.0615	N	160	39.9364	E	5273.97	40.121.74	mag (ea600) ok; em302 ok; sv used (1534.5) (loaded the latest XBT) -AP
289	10/16/15	3:30:00	7.5	325.12	32	47.1563	N	160	36.1940	E	5203.73	40.103.26	mag (ea600) ok; em302 ok; sv used (1535.1) -PK
289	10/16/15	3:36:24	6.9	1.29	32	48.1984	N	160	35.9691	E	5197.31	40.105.30	start of line 002
289	10/16/15	4:00:00	8	2.2	32	50.5644	N	160	36.0032	E	5175	40.128.00	mag ok; em ok
289	10/16/15	4:30:00	8	359	32	54.6774	N	160	35.9978	E	5155	40.238.63	mag ok; em ok
289	10/16/15	5:00:00	7.8	1.77	32	58.5253	N	160	36.0065	E	5224	40.356.13	mag ok; em ok
289	10/16/15	5:30:00	8.4	0.28	33	2.7161	N	160	36.0116	E	5140	40.334.89	mag ok; em ok
289	10/16/15	6:00:00	8.5	258.66	33	6.9113	N	160	36.0007	E	5239	40.347.56	mag ok; em ok
289	10/16/15	6:34:00	8.4	1.93	33	10.5200	N	160	35.9991	E	5105	40.447.14	mag ok; em ok
289	10/16/15	7:00:00	9	1.65	33	15.2700	N	160	35.9835	E	4572	40.518.93	mag ok; em ok
289	10/16/15	7:30:00	9	1.05	33	19.4608	N	160	36.0047	E	4644	40.394.69	mag ok; em ok
289	10/16/15	8:00:00	8.6	353.55	33	23.4674	N	160	35.9996	E	4270	40.553.32	mag ok; em ok
289	10/16/15	8:30:00	8.1	354	33	27.6070	N	160	36.0070	E	4412	40.579.39	mag ok; em ok
289	10/16/15	9:00:00	7.6	358.23	33	31.6570	N	160	36.0092	E	4312	40.551.88	mag ok; em ok
289	10/16/15	9:30:00	7.9	356.79	33	35.9155	N	160	36.0075	E	4196	40.494.69	mag ok; em ok
289	10/16/15	10:00:00	7.8	355.77	33	39.9592	N	160	36.0050	E	4147	40.591.99	mag ok; em ok
289	10/16/15	10:30:00	8.4	357.75	33	43.8854	N	160	35.9990	E	4022.19	40.763.01	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1534.60) ok ~js
289	10/16/15	11:00:00	8.7	359.68	33	48.8960	N	160	36.0018	E	4194.71	40.896.22	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1534.60) ok ~js
289	10/16/15	11:30:00	8.2	358.03	33	52.2401	N	160	36.0029	E	4162.94	40.797.60	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1534.40) ok ~js
289	10/16/15	12:00:00	8.4	357.72	33	56.3282	N	160	36.0053	E	4088.22	40.899.69	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1534.30) ok ~js
289	10/16/15	12:30:00	7.9	357.83	34	0.0871	N	160	35.9951	E	3698.67	40.787.02	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1533.90) ok ~js
289	10/16/15	13:00:00	6.9	358.57	34	4.2934	N	160	35.9993	E	3561.12	40.798.24	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1532.90) ok ~js
289	10/16/15	13:30:00	8.2	354.16	34	8.5566	N	160	35.9986	E	3712.14	41.087.16	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1532.90) ok ~AP
289	10/16/15	14:00:00	8.6	356.35	34	12.4735	N	160	36.0053	E	3703.22	40.954.38	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1532.90) ok ~AP
289	10/16/15	14:30:00	8.6	357.43	34	16.2475	N	160	36.0017	E	3706.59	40.991.33	mag ok; sampling @ 1.0 Hz; em302 (SV_used - 1532.90) ok ~AP

289	10/16/15	15:00:00	7.7	0.11	34	20.3185	N	160	35.9981	E	3756.4	41,189.00 (SV_used - 1532.90) ok ~PK mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	15:30:00	7.8	0.86	34	24.3995	N	160	35.9989	E	3785.63	41,009.66 (SV_used - 1532.90) ok ~PK mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	16:00:00	7.6	2.26	34	28.2776	N	160	36.0027	E	4073.17	40,792.14 (SV_used - 1532.80) ok ~AP mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	16:30:00	7.9	359.52	34	32.2573	N	160	35.9981	E	4198	40,617.58 (SV_used - 1532.30) ok ~re/jn mag ok; sampling @ 1.0 Hz; em302 yellow box at SV_used - 1531.80 new XBT completed by Rachel and Leighton - no good
289	10/16/15	16:57:00										
289	10/16/15	17:00:00	7.2	7.38	34	36.1801	N	160	35.9919	E	4386	40,737.79 (SV_used - 1531.30) ok ~re/jn re-run XBT, load new SV_used - 1531.80, yellow box off mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	17:06:00										
289	10/16/15	17:30:00	8	1.2	34	39.9592	N	160	36.0081	E	4409	41,062.34 (SV_used - 1531.90) ok ~re/jn mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	18:00:00	8	0	34	43.9866	N	160	36.0069	E	4276	41,419.08 (SV_used - 1532.80) ok ~re/jn mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	18:30:00	8	0.79	34	48.0168	N	160	36.0075	E	4114.97	41,261.16 (SV_used - ?) ok ~re/jn mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	19:00:00	8.1	0.89	34	52.2195	N	160	35.9943	E	4063	41,178.27 (SV_used - 1532.30) ok ~re/jn mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	19:09:00	6.5	354.54	34	53.6592	N	160	36.0037	E	4003	41,144.99 end of line 2 mag ok; sampling @ 1.0 Hz; em302
289	10/16/15	19:30:00	6.9	309.14	34	55.4124	N	160	34.1310	E	4064	41,018.13 mag ok; turning toward line 3
289	10/16/15	20:00:00	8.4	308.73	35	57.9197	N	160	30.8055	E	4173	41,039.56 mag ok; turning toward line 3
289	10/16/15	20:30:00	7.7	309.76	35	0.6175	N	160	27.2987	E	4145	41,170.73 mag ok; turning toward line 3
289	10/16/15	21:00:00	8.3	311.84	35	3.2543	N	160	23.7899	E	4104	41,210.83 mag ok; turning toward line 3
289	10/17/15	21:05:00										Created new line survey Turn003 FK151005_tamu_line_003
289	10/16/15	21:30:00	7.7	312.06	35	5.7284	N	160	20.5251	E	4154	41,213.82 mag ok; turning toward line 3
289	10/16/15	22:00:00	8.2	307.76	35	8.4228	N	160	16.9702	E	4196	41,229.57 mag ok; turning toward line 3
289	10/16/15	22:30:00	7.8	295.64	35	10.8744	N	160	13.4910	E	4189.64	41,241.59 mag ok; turning toward line 3
289	10/16/15	22:44:15										start of line 003, starts at file 38
289	10/16/15	23:00:00	7.7	174.69	35	7.1850	N	160	12.0285	E	4328.34	41,202.30 mag is ok
289	10/16/15	23:30:00	7.5	175.63	35	2.7167	N	160	11.9956	E	4457.45	41,423.90 mag is ok
290	10/17/15	0:00:00	8.1	185.39	34	58.9906	N	160	12.0009	E	4474.69	41,263.90 mag is ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
290	10/17/15	0:00:00	8.1	185.39	34	58.9906	N	160	12.0009	E	4474.69	41,263.90	mag is ok
290	10/17/15	0:30:00	8.5	175.89	34	55.3912	N	160	11.9993	E	4467.76	41,329.70	mag is ok
290	10/17/15	1:00:00	7.9	180.79	34	51.3337	N	160	12.0047	E	4545.91	41,670.49	mag is ok
290	10/17/15	1:30:00	8.1	189.12	34	47.2449	N	160	11.9954	E	4468.36	41,423.65	mag is ok
290	10/17/15	2:00:00	7.6	185.85	34	42.6902	N	160	11.9951	E	4296.63	40,992.22	mag is ok
290	10/17/15	2:30:00	8.1	182.18	34	39.2210	N	160	11.9926	E	4124.81	40,839.16	mag is ok
290	10/17/15	3:00:00	8	180.81	34	34.9383	N	160	11.9970	E	4005.08	40,990.40	mag is ok
290	10/17/15	3:30:00	8.2	187.42	34	30.9847	N	160	12.0008	E	3929.85	41,197.38	iss all good -AP
290	10/17/15	4:00:00	7.7	179.95	34	26.9058	N	160	11.9977	E	3873.12	41,221.37	mag is ok
290	10/17/15	4:30:00	8	179.44	34	23.0072	N	160	12.0060	E	3825	41,121.55	mag is ok
290	10/17/15	5:00:00	8	184.61	34	19.0242	N	160	11.9904	E	3793	41,028.62	mag is ok
290	10/17/15	5:30:00	8.3	183.11	34	15.0789	N	160	11.9926	E	3740	40,866.12	mag is ok
290	10/17/15	6:00:00	8	182.45	34	11.1174	N	160	11.9894	E	3456	40,924.45	mag is ok
290	10/17/15	6:30:00	7.8	176.07	34	7.2505	N	160	11.9937	E	3695	40,767.07	mag is ok
290	10/17/15	7:00:00	7.6	178.12	34	3.5440	N	160	11.9937	E	4052	40,953.75	mag is ok
290	10/17/15	7:30:00	7.7	182.13	33	59.6394	N	160	12.0040	E	3901	40,962.30	mag is ok
290	10/17/15	8:00:00	8.1	176.8	33	55.6137	N	160	12.0002	E	3956	40,979.04	mag is ok
290	10/17/15	8:30:00	8.4	182.93	33	51.5653	N	160	11.9987	E	4347	40,933.21	mag is ok
290	10/17/15	9:00:00	8.4	171.06	33	47.4884	N	160	11.9975	E	4345	40,913.05	mag is ok
290	10/17/15	9:30:00	8.3	178.87	33	43.5499	N	160	12.0017	E	4329	40,936.53	mag is ok
290	10/17/15	10:00:00	8.9	184.24	33	39.7207	N	160	12.0000	E	4295	40,799.99	mag is ok
290	10/17/15	10:30:00	7.7	178.01	33	35.4814	N	160	11.9999	E	4327.29	40,591.08	mag is ok
290	10/17/15	10:50:00	8.5	175.85	33	32.4727	N	160	12.0004	E	4496.88	40,549.20	new sound velocity profile loaded
290	10/17/15	11:00:00	8.5	177.97	33	31.3349	N	160	12.0075	E	4528.94	40,543.45	mag is ok
290	10/17/15	11:30:00	8.1	183.31	33	26.8616	N	160	12.0010	E	4568.03	40,503.06	mag is ok
290	10/17/15	12:00:00	7.8	179.1	33	23.3475	N	160	11.9954	E	4675.33	40,499.33	mag is ok
290	10/17/15	12:30:00	7.6	179.39	33	19.3240	N	160	11.9953	E	4641.54	40,456.92	mag is ok
290	10/17/15	13:00:00	7.9	182.03	33	16.3141	N	160	12.0074	E	4756.01	40,413.95	mag is ok
290	10/17/15	14:00:00	8.2	186.43	33	11.4790	N	160	11.9982	E	4761.99	40,393.69	mag is ok
290	10/17/15	14:30:00	8.1	180.58	33	7.4460	N	160	11.9990	E	4735.92	40,347.11	mag is ok
290	10/17/15	14:30:00	8.3	184.1	33	3.2407	N	160	11.9968	E	4634.58	40,272.81	mag is ok
290	10/17/15	15:00:00	7.8	176.6	32	59.2486	N	160	12.0071	E	4654.94	40,277.25	mag is ok
290	10/17/15	15:30:00	8.1	175.36	32	55.1193	N	160	12.0011	E	4624	40,296.92	mag is ok
290	10/17/15	16:00:00	7.9	180.4	32	51.4304	N	160	11.9979	E	4754.87	40,294.30	mag is ok
290	10/17/15	16:30:00	8	182.85	32	47.4647	N	160	11.9970	E	4925	40,173.48	mag is ok
290	10/17/15	17:00:00	7.8	185.26	32	43.4831	N	160	12.0018	E	4951	40,099.51	mag is ok
290	10/17/15	17:30:00	7.6	185.16	32	39.8774	N	160	11.9972	E	4897	40,091.11	mag is ok
290	10/17/15	18:00:00	7.7	178.04	32	35.9728	N	160	11.9901	E	4959	40,113.00	mag is ok
290	10/17/15	18:30:00	8.3	180.58	32	32.0750	N	160	11.9961	E	5015	40,108.37	mag is ok
290	10/17/15	19:00:00	8	185.59	32	28.0000	N	160	11.9919	E	4988	40,111.76	mag is ok
290	10/17/15	19:30:00	8.2	178.88	32	24.0698	N	160	11.9965	E	5019	40,113.01	mag is ok
290	10/17/15	20:00:00	8	176.26	32	20.0085	N	160	11.9982	E	5134	40,085.64	mag is ok
290	10/17/15	20:30:00	7.9	182.04	32	15.7950	N	160	11.9940	E	5191	40,087.55	mag is ok

290	10/17/15	21:00:00	7.5	171.07	32	12.0763	N	160	12.0133	E	4316	40,052.89 mag is ok
290	10/17/15	21:30:00	7.9	177.09	32	7.8100	N	160	11.9990	E	5180	39,956.71 mag is ok
290	10/17/15	22:00:00	8.4	176.18	32	4.4825	N	160	11.9954	E	5223	39,926.99 mag is ok
290	10/17/15	22:30:00	8.5	180.73	31	59.9850	N	160	12.0019	E	5149.81	39,828.92 mag is ok
290	10/17/15	23:00:00	8.2	181.49	31	56.1759	N	160	11.9949	E	5355.76	39,721.23 mag is ok
290	10/17/15	23:30:00	8.3	172.75	31	52.2073	N	160	12.0048	E	5349.55	39,672.07 mag is ok
290	10/17/15	23:57:00	8.2	208.8	31	48.5377	N	160	11.9757	E	5386.51	<i>end of line 3; end line 63 -</i> <i>manually change to line 0064</i>

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
291	10/18/15	0:00:00	8.3	171.24	31	48.3318	N	160	11.9697	E	5286.64	39,668.75 mag ok	
291	10/18/15	0:30:00	8.3	212.12	31	45.0865	N	160	8.6420	E	5172.23	39,734.25 mag ok	
291	10/18/15	1:00:00	7.9	228.11	31	42.4176	N	160	5.6065	E	5092.28	39,675.15 mag ok	
291	10/18/15	1:30:00	8.4	224.51	31	38.8178	N	160	1.4833	E	4933.13	39,614.27 mag ok	
291	10/18/15	2:00:00	8	224.96	31	36.5159	N	159	58.8717	E	5065.27	39,646.50 mag ok	
291	10/18/15	2:30:00	8	223.54	31	33.7750	N	159	55.7376	E	5049.3	39,649.58 mag ok	
291	10/18/15	3:00:00	8.1	221.24	31	30.6234	N	159	52.1709	E	5019.83	39,675.22 mag ok	
291	10/18/15	3:07:00											creating new mag survey FK151005_Tamu_Line_004
291	10/18/15	3:15:00											XBT launch and new SV profile loaded
291	10/18/15	3:30:00	7.4	303.56	31	28.5154	N	159	48.7013	E	4896.32	39,659.76 mag ok	
291	10/18/15	3:42:00											line count 68 will begin tract 4, heading North
291	10/18/15	4:00:00	7.9	359.97	31	31.9675	N	159	47.9928	E	4878.63	39,652.70 mag ok	
291	10/18/15	4:30:00	8	2.53	31	36.2467	N	159	47.9929	E	4896	39,603.53 mag ok	
291	10/18/15	5:00:00	7.8	3.61	31	40.1319	N	159	47.9926	E	4812	39,671.30 mag ok	
291	10/18/15	5:30:00	8.1	2.06	31	44.1324	N	159	47.9933	E	4551	39,650.59 mag ok	
291	10/18/15	6:00:00	8	1.14	31	48.0392	N	159	47.9892	E	4567	39,563.11 mag ok- INCREASE SPEED TO 8.25 AND CHANGE LINE TO 71	
291	10/18/15	6:30:00	8.7	1.81	31	52.2493	N	159	48.0080	E	4621	39,723.41 MAG OK	
291	10/18/15	7:00:00	8	1.75	31	56.4424	N	159	47.9982	E	4646	39,849.40 MAG OK	
291	10/18/15	7:30:00	9.1	3.83	32	0.7196	N	159	47.9977	E	4737	39,828.95 MAG OK	
291	10/18/15	8:00:00	8.6	6.58	32	5.0384	N	159	48.0019	E	4775	39,841.12 MAG OK	
291	10/18/15	8:30:00	9.4	4.2	32	9.6253	N	159	47.9963	E	4845	39,933.34 MAG OK	
291	10/18/15	8:45:00											Slowing down to 6kts for 15 min to clear some fans
291	10/18/15	9:00:00	6	4.04	32	13.0468	N	159	47.9532	E	4737	39,999.49 MAG OK; speed back to 8kts	
291	10/18/15	9:30:00	7.8	1.88	32	17.1908	N	159	48.0080	E	4705	40,016.43 MAG OK	
291	10/18/15	10:00:00	9	2.48	32	21.3978	N	159	48.0053	E	4597	40,099.69 MAG OK	
291	10/18/15	10:30:00	9.7	4.92	32	25.7690	N	159	48.0010	E	4498	40,155.50 MAG OK	
291	10/18/15	11:00:00	9.2	358.17	32	30.2259	N	159	48.0003	E	4451	40,115.28 mag ok	
291	10/18/15	11:30:00	9.5	358.24	32	34.6478	N	159	48.0035	E	4510	40,171.28 mag ok	
291	10/18/15	12:00:00	9.7	535.35	32	39.0740	N	159	48.0003	E	4413	40,204.47 mag ok	
291	10/18/15	12:30:00	9.78	0.39	32	43.4604	N	159	47.9995	E	4447	40,254.00 mag ok	
291	10/18/15	13:00:00	7.3	5.92	32	48.0937	N	159	48.0004	E	4465	40,258.44 mag ok	
291	10/18/15	13:30:00	8.6	5.14	32	52.2308	N	159	48.0040	E	4355	40,260.27 mag ok	
291	10/18/15	14:00:00	8.2	2.09	32	56.5056	N	159	48.0043	E	4386	40,315.10 mag ok	
291	10/18/15	14:30:00	8.8	358.68	33	0.6591	N	159	48.0001	E	4385	40,374.30 mag ok	
291	10/18/15	15:00:00	6.2	358.44	33	4.6351	N	159	47.9962	E	4307	40,468.77 mag ok	
291	10/18/15	15:30:00	8.6	359	33	8.2755	N	159	48.0113	E	4254	40,390.11 mag ok	
291	10/18/15	16:00:00	7.5	3.19	33	12.4342	N	159	47.9935	E	4292.18	40,437.97 mag ok	
291	10/18/15	16:30:00	8.4	7.58	33	16.7542	N	159	48.0029	E	4315	40,635.19 mag ok	
291	10/18/15	17:00:00	8.7	4.92	33	21.0987	N	159	48.0025	E	4377	40,697.61 mag ok	
291	10/18/15	17:30:00	8.7	1.08	33	25.2244	N	159	48.0079	E	4360	40,644.15 mag ok	
291	10/18/15	18:00:00	8	2.75	33	29.1514	N	159	48.0000	E	4158	40,636.44 mag ok	
291	10/18/15	18:30:00	8	1.72	33	33.3561	N	159	47.9926	E	4145	40,625.44 mag ok	
291	10/18/15	19:00:00	8.3	0.37	33	37.1355	N	159	48.0048	E	3909	40,768.86 mag ok	
291	10/18/15	19:30:00	8.7	3.23	33	41.1218	N	159	47.9935	E	3691	40,769.00 mag ok	
291	10/18/15	20:00:00	8.3	0.02	33	45.3234	N	159	47.9996	E	3716	40,867.65 mag ok	
291	10/18/15	20:30:00	8.9	355.19	33	49.5708	N	159	47.9905	E	3606	40,914.09 mag ok	
291	10/18/15	21:00:00	8.8	6.5	33	53.7961	N	159	48.0025	E	3551	40,931.93 mag ok	
291	10/18/15	21:30:00	8.6	350.2	33	58.2483	N	159	48.0071	E	3761	40,821.27 mag ok	
291	10/18/15	22:00:00	9.3	349.49	34	2.2222	N	159	47.9902	E	3406	40,944.98 mag ok	

291	10/18/15	22:30:00	9.2	332.06	34	6.5655	N	159	48.0010	E	3241	41,008.60 mag ok
291	10/18/15	23:00:00	8.6	355.51	34	10.5828	N	159	48.0173	E	3268	41,020.17 mag ok
291	10/18/15	23:30:00	8.1	12.82	34	15.0452	N	159	47.9971	E	3291	41,025.55 mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
292	10/19/15	0:00:00	9.9	350.19	34	19.1703	N	159	48.0055	E	3295	40,928.81 mag ok	
292	10/19/15	0:30:00	9.1	356.97	34	23.3248	N	159	47.9972	E	3275	40,898.47 mag ok	
292	10/19/15	1:00:00	8.4	6.81	34	27.3299	N	159	48.0040	E	3474	40,933.62 mag ok	
292	10/19/15	1:30:00	8.5	348.85	34	31.9985	N	159	47.9924	E	3771.48	41,022.96 mag ok	
292	10/19/15	2:00:00	7.8	348.87	34	36.6897	N	159	48.0055	E	3696	41,097.65 mag ok, sv used box displays yellow	
292	10/19/15	2:30:00	8.4	357.34	34	40.4123	N	159	48.0013	E	3935.54	41,216.50 mag ok, sv used box displays yellow	
292	10/19/15	3:00:00	7.7	353.08	34	44.2981	N	159	48.0001	E	4281.32	41,387.66 mag ok, sv used box displays yellow	mag ok, sv used box displays yellow, negative spike on mag
292	10/19/15	3:30:00	7.8	4.37	34	48.2661	N	159	47.9991	E	4586.31	41,598.45 BOB	
292	10/19/15	4:00:00	6.6	2.49	34	52.2998	N	159	47.9982	E	4605.06	41,600.99 mag ok, sv used box display yellow	
292	10/19/15	4:30:00	7.5	356.45	34	56.1409	N	159	48.9992	E	4625	41,466.43 mag ok, sv used box display yellow	
292	10/19/15	5:00:00	7.3	0.91	34	60	N	159	47.9718	E	4722	41,356.14 mag ok, sv used box display yellow	
292	10/19/15	5:30:00	7.4	9.39	35	3.6484	N	159	47.9946	E	4668	41,446.93 mag ok, sv used box display yellow	
292	10/19/15	6:00:00	7.5	3.65	35	7.3817	N	159	47.9966	E	4683	41,546.31 mag ok, sv used box display yellow	
292	10/19/15	6:30:00	7.4	6.56	35	11.2071	N	159	48.0037	E	4704	41,499.29 mag ok, sv used box display yellow	
292	10/19/15	7:00:00	8.6	4.39	35	15.1747	N	159	48.0037	E	4691	41,556.07 mag ok, sv used box display yellow	
292	10/19/15	7:30:00	8.3	347.51	35	19.2683	N	159	48.0050	E	4695	41,504.85 end of line 4; incremented the line count 097;mag ok, sv used box display yellow	
292	10/19/15	8:00:00	8.1	311.54	35	22.1500	N	159	45.0512	E	4738	41,487.14 mag ok, sv used box display yellow	Latest SV profile loaded
292	10/20/15	8:12:00											
292	10/19/15	8:30:00	7.8	298.24	35	24.9143	N	159	41.4621	E	4690	41,706.20 mag ok	
292	10/19/15	9:00:00	9.6	317.64	35	27.9446	N	159	37.6108	E	4680	41,536.72 mag ok	
292	10/19/15	9:30:00	9.3	294.66	35	31.1948	N	159	33.4827	E	4745	41,594.62 mag ok	
292	10/19/15	10:00:00	9	310.5	35	34.1611	N	159	29.6998	E	4823	41,663.03 mag ok	
292	10/19/15	10:12:00	10.6	311.71	35	36.2392	N	159	27.0175	E	4789	41,849.72 line 004 magnetic data exported	
292	10/19/15	10:30:00	8.3	237.88	35	37.2244	N	159	24.8008	E	4765	41,931.05 mag ok	
292	10/19/15	10:33:00	7.5	201.75	35	36.0828	N	159	24.0287	E	4798	mag lost power	
292	10/19/15	10:45:00	6.5	159.87	35	35.5827	N	159	23.9557	E	4812	start line 5; manually changed from 0100 to 0101	
292	10/19/15	11:00:00											
292	10/19/15	11:02:00	7.7	152.87	35	33.4466	N	159	23.9980	E	4813	41640.01 power back to magnetometer; start line 5_1	
292	10/19/15	11:30:00	6.1	173.01	35	30.2055	N	159	24.0394	E	4819	41663.18 mag ok	
292	10/19/15	12:00:00	8.4	165.21	35	26.8940	N	159	23.9988	E	4732	41839.58 mag ok	
292	10/19/15	12:30:00	8.2	205.33	35	23.9988	N	159	24.0061	E	4722	41806.19 mag ok	
292	10/19/15	13:00:00	8.6	168.67	35	18.5824	N	159	24.9997	E	4804	41635.45 mag ok	
292	10/19/15	13:30:00	8.2	157.54	35	14.4159	N	159	24.0060	E	4894	41513.77 mag ok, sv used box displays yellow	
292	10/19/15	14:00:00	9.9	184.66	35	10.0048	N	159	24.0029	E	4795.7	41537.7 mag ok, sv used box displays yellow	
292	10/19/15	14:30:00	9	184.32	35	5.6159	N	159	24.0014	E	4508.8	41454.15 mag ok, sv used box displays yellow	
292	10/19/15	15:00:00	8.4	203.73	35	1.0946	N	159	23.9917	E	4734.94	41264.94 mag ok, sv used box displays yellow	
292	10/19/15	15:30:00	8.3	196.66	34	56.5181	N	159	24.0007	E	4748.67	41557.96 mag ok, sv used box displays yellow	
292	10/19/15	16:00:00	9.4	180.24	34	52.2043	N	159	23.9947	E	4520.15	41530.45 mag ok, sv used box displays yellow	
292	10/19/15	16:30:00	8.7	167.61	34	47.4048	N	159	24.0012	E	4304	41,577.56 mag ok, sv used box displays yellow	
292	10/19/15	17:00:00	8.6	191.87	34	42.9289	N	159	23.9934	E	4014	41,338.14 mag ok	
292	10/19/15	17:30:00	9	181.19	34	38.5627	N	159	23.9907	E	3799	41,154.33 mag ok, sv used box displays yellow	
292	10/19/15	18:00:00	9.2	190.15	34	34.0062	N	159	23.9984	E	3735	41,306.48 mag ok, sv used box displays yellow	mag ok, sv used box displays yellow, starting to go over
292	10/19/15	18:30:00	9	174.27	34	29.7736	N	159	23.9967	E	3634	41,127.70 something	
292	10/19/15	19:00:00	9	160.9	34	25.2982	N	159	23.9939	E	3274	40,906.52 mag ok, sv used box displays yellow	
292	10/19/15	19:22:00											Latest SV profile loaded
292	10/19/15	19:30:00	9.5	184.57	34	20.0486	N	159	23.9988	E	3288	41,060.98 mag ok	

292	10/19/15	20:00:00	8.4	185.71	34	16.6782	N	159	23.9977	E	3255	41,155.82 mag ok
292	10/19/15	20:30:00	8.2	179.09	34	12.5177	N	159	24.0054	E	3304	41,223.48 mag ok
292	10/19/15	21:00:00	8.1	175.36	34	8.2162	N	159	23.9979	E	3428	41,229.25 mag ok
292	10/19/15	21:30:00	8.2	184.86	34	3.8733	N	159	24.0047	E	3505	41,084.76 mag ok
292	10/19/15	22:00:00	8.1	179.6	33	59.7204	N	159	23.9984	E	3440	40,931.60 mag ok
292	10/19/15	22:30:00	7.8	180.07	33	55.2577	N	159	24.0001	E	3426	40,797.93 mag ok
292	10/19/15	23:00:00	8.5	174.62	33	50.8300	N	159	24.0004	E	3222	40,740.39 mag ok
292	10/19/15	23:30:00	6.8	179.9	33	46.7569	N	159	24.0024	E	3112	40,814.04 mag ok
293	10/20/15	0:00:00	8.1	175.85	33	42.5604	N	159	23.9928	E	3087	40,832.02 mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
293	10/20/15	0:00:00	8.1	175.85	33	42.5604	N	159	23.9928	E	3087	40,832.02	mag ok
293	10/20/15	0:30:00	8.5	183.81	33	38.1659	N	159	23.9965	E	3180	40,842.21	mag ok
293	10/20/15	1:00:00	9.8	188.49	33	33.8557	N	159	23.9945	E	3298	40,817.21	mag ok
293	10/20/15	1:30:00	8.5	177.44	33	29.3402	N	159	24.0035	E	3374.82	40,852.78	mag ok
293	10/20/15	2:00:00	8.5	174.46	33	24.9225	N	159	23.9973	E	3436.85	40,737.22	mag ok
293	10/20/15	2:30:00	9.2	186.64	33	20.072	N	159	24.0094	E	3546.67	40,631.66	mag ok
293	10/20/15	3:00:00	9.2	188.14	33	15.7827	N	159	23.9975	E	3599.92	40,582.83	mag ok
293	10/20/15	3:30:00	8.5	181.6	33	11.2626	N	159	23.9927	E	3739.93	40,517.24	mag ok
293	10/20/15	4:00:00	9.5	185.39	33	6.5675	N	159	23.9922	E	3675.42	40,402.96	mag ok
293	10/20/15	4:30:00	8.8	173.76	33	1.8728	N	159	24.0018	E	3799	40,350.54	mag ok
293	10/20/15	5:00:00	9.2	172.45	32	57.2079	N	159	23.9967	E	3785	40,488.28	mag ok
293	10/20/15	5:30:00	9.3	179.49	32	52.6364	N	159	24.0011	E	3884	40,332.75	mag ok
293	10/20/15	6:00:00	9.3	187.21	32	47.9757	N	159	24.0133	E	3831	40,386.35	mag ok
293	10/20/15	6:30:00	9	180.91	32	43.3242	N	159	24.0036	E	3831	40,469.99	mag ok
293	10/20/15	7:00:00	9.3	182.05	32	38.724	N	159	23.9942	E	3865	40,392.95	mag ok
293	10/20/15	7:30:00	9.4	181.56	32	33.744	N	159	23.9976	E	3914	40,241.79	mag ok
293	10/20/15	8:00:00	9.2	179.25	32	29.8943	N	159	23.9977	E	3874	40,189.47	mag ok
293	10/20/15	8:30:00	9.4	184.46	32	24.9306	N	159	24.0015	E	3908	40,149.23	mag ok
293	10/20/15	9:00:00	8.4	177.51	32	20.0783	N	159	24.009	E	3931	40,168.58	mag ok
293	10/20/15	9:30:00	9.2	181.42	32	15.4805	N	159	24.003	E	3966	40,159.79	mag ok
293	10/20/15	10:00:00	9	186.4	32	10.9083	N	159	24.0021	E	3849	40,157.48	mag ok
293	10/20/15	10:30:00	9.5	174.85	32	5.7885	N	159	24.0058	E	3867	40,054.16	mag ok
293	10/20/15	11:00:00	8.6	176.09	32	1.6916	N	159	23.9923	E	3964	40,006.22	mag ok
293	10/20/15	11:30:00	9.6	179.92	31	57.4181	N	159	24.0015	E	3917	39,982.24	mag ok
293	10/20/15	12:00:00	9.3	185.01	31	52.7746	N	159	23.9889	E	3872	39,799.5	mag ok
293	10/20/15	12:30:00	9.3	184.69	31	48.0892	N	159	23.9941	E	3974	39,821.75	mag ok
293	10/20/15	13:00:00	9.8	181.29	31	43.1635	N	159	23.9993	E	3917	39,841.12	mag ok
293	10/20/15	13:30:00	9	182.77	31	38.6959	N	159	23.9988	E	4094	39,639	mag ok
293	10/20/15	14:00:00	8.9	184.95	31	33.9843	N	159	24.0062	E	4228.57	39,677.8	mag ok
293	10/20/15	14:30:00	9.1	176.08	31	29.4555	N	159	24.0061	E	4282.78	39,751.64	mag ok
293	10/20/15	15:00:00	9.7	183.62	31	25.0292	N	159	23.9964	E	4322.98	39,744.59	mag ok
293	10/20/15	15:30:00	9.3	175.61	31	20.3915	N	159	20.0019	E	4307.86	39,556.05	mag ok
293	10/20/15	16:00:00	9.6	181.59	31	15.5901	N	159	23.9921	E	4304.03	39,673.03	mag ok
293	10/20/15	16:30:00	9	180.31	31	11.1051	N	159	24.011	E	4545	39,604.08	mag ok
293	10/20/15	16:37:30	9.2	189.41	31	9.8232	N	159	23.9557	E	4414	39,562.95	end of line 5, line count increased to 131, new line 006 for maggie
293	10/20/15	17:00:00	8.7	240.02	31	7.7673	N	159	21.1448	E	4569	39,576.65	mag ok, still on curve to line 6
293	10/20/15	17:30:00	8.7	230.2	31	4.8967	N	159	17.3314	E	4632	39,563.91	mag ok, still on curve to line 6
293	10/20/15	18:00:00	9	223.61	31	1.9365	N	159	13.4769	E	4731	39,618.48	mag ok, still on curve to line 6
293	10/20/15	18:30:00	8.8	234.83	30	58.8707	N	159	9.4414	E	4688	39,604.81	mag ok, still on curve to line 6
293	10/20/15	19:00:00	9	230.14	30	55.87	N	159	5.5274	E	4821	39,555.62	mag ok, still on curve to line 6
293	10/20/15	19:30:00	9.2	256.36	30	52.8971	N	159	1.5021	E	4431	39,775.07	mag ok, almost ending curve to line 6
293	10/20/15	19:43:00	19:43:00	30	53.9688	53.9688	N	158	59.9888	E	start of line 6; line count incremented to 134		
293	10/20/15	20:00:00	7.6	3.24	30	56.056	N	159	0.0095	E	4631	39,480.01	mag ok; speed increased to 9kts
293	10/20/15	20:30:00	9.8	0.21	31	0.524	N	158	59.9962	E	4730	39,565.29	mag ok
293	10/20/15	21:00:00	10	1.19	31	6.9838	N	158	59.9949	E	4496	39,829.53	mag ok
293	10/20/15	21:30:00	9.9	3.05	31	10.3332	N	158	59.9991	E	4391	39,744.56	mag ok
293	10/20/15	22:00:00	9.4	1.94	31	15.2979	N	158	59.9974	E	3204	39,702.47	mag ok
293	10/20/15	22:30:00	9.3	4.17	31	20.5125	N	158	59.9959	E	3631	39,574.93	mag ok
293	10/20/15	23:00:00	9.2	2.01	31	25.0161	N	159	59.9997	E	3866	39,765.13	mag ok
293	10/20/15	23:30:00	9.7	356.48	31	29.9205	N	158	59.9909	E	2977	39,702.39	mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
294	10/21/15	0:00:00	9.6	1.03	31	34.6516	N	158	59.9956	E	3109	39419.07	mag ok
294	10/21/15	0:30:00	9.9	359.82	31	39.3003	N	158	59.9949	E	3559	39719.61	mag ok
294	10/21/15	1:00:00	9.6	356.06	31	44.0971	N	159	0.0061	E	3537	39793.72	mag ok
294	10/21/15	1:30:00	9.5	348.99	31	49.3235	N	159	0.0053	E	3349	39895.17	mag ok
294	10/21/15	2:00:00	10.2	0.64	31	54.3599	N	158	59.9991	E	3245	40008.69	mag ok
294	10/21/15	2:30:00	10.5	2.27	31	59.0633	N	158	59.9875	E	3133	39967.41	mag ok
294	10/21/15	3:00:00	9.8	358.91	32	4.265	N	158	59.9878	E	3190.43	39970.21	mag ok
294	10/21/15	3:30:00	9.9	357.24	32	9.4035	N	159	0.0085	E	3311.23	40,148.24	mag ok
294	10/21/15	4:00:00	9.5	1.76	32	14.1841	N	159	0.01	E	3148.75	40204.05	mag ok
294	10/21/15	4:30:00	9.5	1.37	32	19.107	N	159	0.0001	E	3037	40,300.39	mag ok
294	10/21/15	5:00:00	10	1.27	32	23.8715	N	159	0.0024	E	2868	40,321.65	mag ok
294	10/21/15	5:30:00	9.8	0.34	32	28.66	N	159	0.0006	E	2774	40,288.74	mag ok
294	10/21/15	6:00:00	9.5	1.37	32	33.446	N	159	0.0036	E	2725	40,350.59	mag ok
294	10/21/15	6:30:00	9.3	0.08	32	38.2034	N	158	59.9916	E	2705	40,413.30	mag ok
294	10/21/15	7:00:00	9.8	4.58	32	43.0222	N	158	59.9977	E	2713	40,417.13	mag ok
294	10/21/15	7:30:00	9.7	6.22	32	47.592	N	159	0.005	E	2777	40,487.23	mag ok
294	10/21/15	8:00:00	9	356.75	32	52.327	N	159	0.0035	E	2848	40582.8	mag ok
294	10/21/15	8:30:00	9.1	359.55	32	57.0407	N	159	0.0019	E	2956	40621.05	mag ok
294	10/21/15	9:00:00	9.2	353.54	33	1.5644	N	159	0.0008	E	3073	40707.43	mag ok
294	10/21/15	9:30:00	9.7	4.75	33	6.2454	N	158	59.9997	E	3125	40830.91	mag ok
294	10/21/15	10:00:00	9.7	0.41	33	10.7871	N	159	0.0095	E	3036	40866.15	mag ok
294	10/21/15	10:17:00	8.8	358.09	33	13.8681	N	159	0.003	E	3031	40900.57	Jenn informed MT that SV Used is yellow, however no XBT performed
294	10/21/15	10:30:00	9.2	0.8	33	15.8655	N	158	59.9988	E	3061	40976.63	XBT 20
294	10/21/15	11:00:00	8.8	356.56	33	19.6383	N	158	59.9959	E	3167	40916.83	mag ok
294	10/21/15	11:30:00	8.9	2.3	33	24.6068	N	159	0.0039	E	3082	40661.72	mag ok
294	10/21/15	12:00:00	9.6	0.02	33	26.6998	N	158	59.996	E	2976	40605.61	mag ok
294	10/21/15	12:30:00	9.7	1.68	33	34.0679	N	159	0.0052	E	2923	40645.98	mag ok
294	10/21/15	13:00:00	9.3	1.24	33	38.75	N	159	0.0063	E	3002	40780.72	mag ok
294	10/21/15	13:30:00	9.6	353.16	33	43.8147	N	159	0.0141	E	3152.63	40911.37	mag ok
294	10/21/15	14:00:00	9.5	358.82	33	48.4454	N	159	0.0081	E	3251.61	40943.23	mag ok
294	10/21/15	14:30:00	9.1	352.9	33	52.9935	N	159	0.0038	E	3213.57	41067.25	mag ok
294	10/21/15	15:00:00	9.2	6.95	33	57.7258	N	159	0.0042	E	3284.22	41144.44	mag ok
294	10/21/15	15:30:00	9.5	355.28	34	2.3522	N	158	59.9906	E	3371.2	41,115.54	mag ok
294	10/21/15	16:00:00	9	1.03	34	7.2169	N	159	0.0048	E	3550.89	41186.53	mag ok
294	10/21/15	16:30:00	10	2.31	34	11.9986	N	159	0.007	E	3699	41,311.00	mag ok
294	10/21/15	17:00:00	10	6.81	34	16.6976	N	158	59.9971	E	3463	41,156.71	mag ok
294	10/21/15	17:30:00	9.5	0.87	34	21.2544	N	159	0.0057	E	3538	41,146.51	mag ok
294	10/21/15	18:00:00	9.3	3.33	34	25.8511	N	159	0.0005	E	3935	41,038.89	mag ok
294	10/21/15	18:30:00	9.2	356.6	34	34.4298	N	159	0.0018	E	4113	41,243.49	mag ok
294	10/21/15	19:00:00	9.7	350.9	34	35.0268	N	158	60	E	4452	41,092.74	mag ok
294	10/21/15	19:30:00	8.2	359.26	34	39.3063	N	159	0.014	E	4516	41353.67	new sv profile loaded; mag ok

294	10/21/15	20:00:00	9.5	0.22	34	43.9858	N	159	0.0012	E	4590	41,616.22 mag ok
294	10/21/15	20:30:00	8.5	7.16	34	48.3394	N	159	0.0685	E	4778	41,755.83 mag ok
294	10/21/15	21:00:00	8.2	2.22	34	53.1981	N	158	59.9955	E	4948	41,725.75 mag ok
294	10/21/15	21:30:00	8.3	356.28	34	57.8029	N	159	0.0026	E	5024	41,523.39 mag ok
294	10/21/15	21:45:00			35	0.4931	N	158	59.9964	E		speed increased to 10 kts
294	10/21/15	22:00:00	10.8	355.14	35	2.5176	N	158	0.0062	E	4190	41,459.19 mag ok
294	10/21/15	22:30:00	10.6	345.03	35	7.6752	N	158	59.9988	E	2823	41,475.13 mag ok
294	10/21/15	23:00:00	9.9	344.25	35	12.4531	N	158	59.9999	E	2916	41,611.41 mag ok
294	10/21/15	23:30:00	10.2	2.46	35	17.883	N	158	59.9956	E	4303	41,644.79 mag ok
294	10/21/15	23:32:29										SV Used is yellow; Safety meeting

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
295	10/22/15	0:00:00	10.01	0.81	35	22.4749	N	158	59.9777	E	4995	41,670.36	mag ok; sv used red/yellow - mt's on fire
295	10/22/15	0:08:00	9.2	273.64	35	24.0376	N	158	59.9886	E	4992	41,625.66	drill
295	10/22/15	0:30:00	9.8	272.64	35	24.2936	N	158	55.089	E	4993	41,755.56	mag ok
295	10/22/15	1:00:00	10.6	272.94	35	24.6369	N	158	49.4815	E	4989	42,025.75	mag ok
295	10/22/15	1:30:00	10.1	267.65	35	25.0228	N	158	43.076	E	4940.04	41,970.33	mag ok
295	10/22/15	1:42:00											started a new mag survey
295	10/22/15	2:00:00	9.9	215.74	35	24.9758	N	158	36.2147	E	4676.44	41,771.47	FK151005_Tamu_line_007 mag ok, turning into line 007
295	10/22/15	2:14:00			35	23.2211	N	158	36.02	E			beginning line 007, increment to line cnt
295	10/22/15	2:30:00	10.3	193.16	35	20.4899	N	158	36.0107	E	5005.27	41,909.26	167 mag ok
295	10/22/15	2:50:00	10.2	183.39	35	16.5622	N	158	36.0269	E	5057.2	41,875.10	new XBT, (25)
295	10/22/15	3:00:00	10.4	180.66	35	15.281	N	158	36.0072	E	5050.31	41,877.95	mag ok
295	10/22/15	3:30:00	10.4	171.56	35	10.0823	N	158	36.0095	E	4731.28	41,800.34	mag ok
295	10/22/15	4:00:00	10.4	188.08	35	5.067	N	158	36.0002	E	4702.15	41,774.12	gps sensor started blinking red, error corrected, mag ok
295	10/22/15	4:30:00	10.3	185.58	34	59.5467	N	158	35.9975	E	5090	41,537.04	mag ok
295	10/22/15	5:00:00	10.3	178.39	34	54.8319	N	158	35.9948	E	4963	41,437.34	mag ok
295	10/22/15	5:30:00	10	181.57	34	49.9885	N	158	35.9909	E	4832	41,515.13	mag ok
295	10/22/15	6:00:00	10	183.24	34	44.835	N	158	35.9925	E	4837	41,281.02	mag ok
295	10/22/15	6:30:00	10	180.75	34	39.8016	N	158	35.9975	E	4785	41,504.07	mag ok
295	10/22/15	6:54:00											single negative spike in mag
295	10/22/15	7:00:00	9.6	179.94	34	34.7237	N	158	35.997	E	4669	41,143.03	mag ok
295	10/22/15	7:30:00	10.1	183.42	34	29.7891	N	158	36	E	4404	41,177.93	mag ok
295	10/22/15	8:00:00	9.4	189.72	34	24.755	N	158	35.9997	E	3977	41,214.56	mag ok
295	10/22/15	8:30:00	9.5	179.4	34	18.45	N	158	35.9961	E	3851	41,469.47	sam insane, but mag ok
295	10/22/15	9:00:00	9.8	179.05	34	14.4942	N	158	35.9955	E	4107	41,488.75	mag ok
295	10/22/15	9:30:00	10	180.72	34	9.4301	N	158	35.9965	E	3969	41,272.86	mag ok
295	10/22/15	10:00:00	9.7	182.44	34	4.3478	N	158	36.0031	E	3657	41,032.22	mag ok
295	10/22/15	10:30:00	10.4	186.45	33	59.5353	N	158	35.998	E	3526	41,052.39	mag ok
295	10/22/15	11:00:00	9.6	182.24	33	54.58	N	158	35.9996	E	3581	41,071.07	mag ok
295	10/22/15	11:30:00	9.9	181.55	33	49.3837	N	158	36.0001	E	3559	41,096.48	mag ok
295	10/22/15	12:00:00	10.2	178.88	33	44.5975	N	158	36.0026	E	3417	41,034.48	mag ok
295	10/22/15	12:30:00	9.8	176.12	33	35.7577	N	158	35.9953	E	3086	40,902.23	mag ok
295	10/22/15	13:00:00	9.9	177.96	33	34.3229	N	158	36.0049	E	3043	40,864.63	mag ok
295	10/22/15	13:30:00	10	180.62	33	29.2434	N	158	36.0062	E	3086.79	40,771.17	mag ok
295	10/22/15	14:00:00	10	180.57	33	24.2927	N	158	35.9933	E	3232.62	40,683.00	mag ok
295	10/22/15	14:30:00	9.8	180.38	33	19.31	N	158	35.9957	E	3236.76	40,586.09	mag ok
295	10/22/15	15:00:00	9.7	179.98	33	14.576	N	158	36.002	E	2871.63	40,691.15	mag ok

295	10/22/15	15:30:00	9.4	173.3	33	9.7727	N	158	36.0038	E	2799.5	40,823.75 mag ok
295	10/22/15	16:00:00	9.2	181.07	33	4.6247	N	158	36.0001	E	2747.67	40,811.49 mag ok
295	10/22/15	16:30:00	9.2	181.85	33	0.2906	N	158	36.0047	E	2683	40,788.42 mag ok
295	10/22/15	17:00:00	9.2	179.65	32	55.7008	N	158	35.998	E	2590	40,672.29 mag ok
295	10/22/15	17:30:00	9.5	184.91	32	51.111	N	158	35.9906	E	2516	40,721.40 mag ok
295	10/22/15	18:00:00	10	183.46	32	46.4241	N	158	36.0033	E	2469	40,715.84 mag ok
295	10/22/15	18:30:00	9.3	179.25	32	41.7837	N	158	35.9977	E	2421	40,763.35 mag ok
295	10/22/15	19:00:00	9	182.9	32	37.2371	N	158	35.9979	E	2415	40,593.19 mag ok
295	10/22/15	19:30:00	9.5	171.57	32	32.6551	N	158	35.9922	E	2484	40,491.14 mag ok
295	10/22/15	20:00:00	9.8	176.61	32	28.0027	N	158	35.9965	E	2627	40,491.64 mag ok
295	10/22/15	20:30:00	9.7	176.09	32	23.6477	N	158	35.9991	E	2710	40,403.09 mag ok
295	10/22/15	21:00:00	10.2	179.48	32	18.7456	N	158	36.0012	E	2770	40,376.14 mag ok
295	10/22/15	21:30:00	10.5	175.63	32	13.5015	N	158	36.0044	E	2587	40,332.05 mag ok
295	10/22/15	22:00:00	10.7	180.21	32	8.3451	N	158	36.0011	E	3000	40,048.13 mag ok
295	10/22/15	22:30:00	10.8	176.77	32	3.0681	N	158	35.9964	E	3057	39,938.55 mag ok
295	10/22/15	23:00:00	11.1	184.01	31	57.9551	N	158	36.0037	E	3135	39,932.41 mag ok
295	10/22/15	23:30:00	10.7	178.74	31	51.7239	N	158	36.0006	E	3065	39,945.19 mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
296	10/23/15	0:00:00	10.4	179.49	31	47.2706	N	158	36.007	E	3151	39,799.75 mag ok	
296	10/23/15	0:30:00	11.1	173.91	31	41.7176	N	158	35.9938	E	3187	39,829.75 mag ok	
296	10/23/15	1:00:00	10.4	175.97	31	36.4939	N	158	36.0005	E	3128	39,698.43 mag ok	
296	10/23/15	1:30:00	10.7	188.25	31	31.4458	N	158	36	E	3303.21	39,713.93 mag ok	
296	10/23/15	2:00:00	10.4	178	31	26.222	N	158	36.002	E	3004.27	39,808.10 mag ok	
296	10/23/15	2:30:00	11.3	181.18	31	20.8813	N	158	36.002	E	3272.18	38,852.06 mag ok	
296	10/23/15	3:00:00	10.7	181.19	31	15.5051	N	158	36.0046	E	3594.58	39,713.32 mag ok	
296	10/23/15	3:30:00	10.5	181.19	31	10.055	N	158	36.0119	E	3738.85	39,990.19 mag ok	
296	10/23/15	4:00:00	10.7	180.89	31	4.6679	N	158	35.9964	E	3918.35	39,493.14 mag ok	
296	10/23/15	4:30:00	10.5	183.25	30	58.8859	N	158	36.0041	E	3686	39,416.98 mag ok	
296	10/23/15	5:00:00	9.8	181.88	30	54.1225	N	158	35.9972	E	4709	40,080.64 mag ok	mag ok, running new XBT in response to yellow warning SV Used - XBT in system
296	10/23/15	5:30:00	10.1	180.19	30	49.2474	N	158	35.9913	E	4890	39,543.35 5:49:00	
296	10/23/15	5:35:00	10	235.78	30	48.3438	N	158	35.9738	E	4975	39,527.39 mag ok, still turning	end of line 7, new line 0195, turning
296	10/23/15	6:00:00	10	234.02	30	45.8949	N	158	32.4283	E	5052	39,357.88 mag ok, still turning	
296	10/23/15	6:30:00	10	234.02	30	43.073	N	158	27.6726	E	5026	39,468.91 mag ok, still turning	
296	10/23/15	7:00:00	10	234.15	30	40.312	N	158	23.0268	E	4984	39,460.77 mag ok, still turning	
296	10/23/15	7:30:00	9.6	233.56	30	37.6167	N	158	18.4871	E			new mag survey created for line 8, FK151005_Tamu_Line_008
296	10/23/15	7:52:00	10	240.87	30	34.8781	N	158	13.8563	E	5051	39,503.67	starting line 8; increased line count to 0198
296	10/23/15	8:14:00	9.2	3.38	30	35.9513	N	158	11.9871	E	4909	39,566.33 mag ok	
296	10/23/15	8:30:00	10.4	3.74	30	39.0577	N	158	12.0023	E	4904	39,446.55 mag ok	
296	10/23/15	9:00:00	10	2.21	30	43.9385	N	158	11.9931	E	4831	39,627.04 mag ok	
296	10/23/15	9:30:00	10.4	6.37	30	48.4776	N	158	12.0008	E	4948	39,580.21 mag ok	
296	10/23/15	10:00:00	9.8	3.43	30	53.5747	N	158	11.9924	E	5086	39,537.00 mag ok	
296	10/23/15	10:30:00	10.6	354.89	30	58.2523	N	158	11.9995	E	4970	39,513.65 mag ok	
296	10/23/15	11:00:00	10.6	4.34	31	3.0885	N	158	11.9927	E	4982	39,620.70 mag ok	
296	10/23/15	11:30:00	9.1	6.33	31	8.4217	N	158	12.0053	E	4919	39,698.56 mag ok	
296	10/23/15	12:00:00	9.4	1.9	31	13.4945	N	158	11.9968	E	4832	39,840.23 mag ok	
296	10/23/15	12:30:00	9.4	5.81	31	18.7177	N	158	12.0065	E	3821	39,982.55 mag ok	
296	10/23/15	13:00:00	10.7	358.17	31	23.5827	N	158	12.0018	E	3616	39,833.03 mag ok	
296	10/23/15	13:30:00	9.4	1.17	31	28.6753	N	158	11.992	E	3444	39,842.90 mag ok	
296	10/23/15	14:00:00	9.4	359.12	31	33.4254	N	158	11.9993	E	3128	40,009.27 mag ok, sv used box yellow	
296	10/23/15	14:30:00	10.4	350.59	31	38.5065	N	158	12.0035	E	3122	40,124.72 mag ok, xbt completed	
296	10/23/15	15:00:00	10.1	1.34	31	43.6554	N	158	11.99	E	3040	40,134.33 mag ok	
296	10/23/15	15:30:00	9	354.43	31	48.3303	N	158	12.0088	E	2937.61	39,897.71 mag ok	
296	10/23/15	16:00:00	10.4	355.51	31	53.4383	N	158	12.0008	E	2937	40,187.19 mag ok	
296	10/23/15	16:30:00	9.4	4.75	31	58.1117	N	158	11.992	E	2687	40,082.56 mag ok	
296	10/23/15	17:00:00	10	1.24	32	3.085	N	158	12.004	E	2683	40,253.14 mag ok	
296	10/23/15	17:30:00	9.5	1.29	32	7.9488	N	158	11.9918	E	2587	40,391.55 mag ok	
296	10/23/15	18:00:00	10	2.51	32	12.8941	N	158	12	E			

296	10/23/15	18:30:00	10	359.1	32	17.9092	N	158	12.0004	E	2515	40,402.51	mag ok
296	10/23/15	19:00:00	9.8	0.76	32	22.7473	N	158	12.006	E	2528	40,519.46	mag ok
296	10/23/15	19:30:00	9.2	7.11	32	27.263	N	158	11.9997	E	2610	40,493.18	mag ok
296	10/23/15	20:00:00	9.1	352.64	32	31.7933	N	158	11.989	E	4481	40,525.28	mag ok
296	10/23/15	20:30:00	10.8	1.58	32	36.2685	N	158	12.0112	E	2305	40,539.21	mag ok; starting up ridge to summit
296	10/23/15	21:00:00	9.3	0.85	32	40.7731	N	158	11.9938	E	2050	40,666.11	mag ok; crossing summit
296	10/23/15	21:30:00	9.1	355.33	32	45.2612	N	158	12.0017	E	2012	40,669.17	mag ok; most shallow on center 1972m;
296	10/23/15	22:00:00	8.7	2.3	32	49.6353	N	158	12.0006	E	2130	40,767.11	most shallow off center (east) 1949m
296	10/23/15	22:30:00	8.9	359.79	32	57.3325	N	158	11.9889	E	2438	40,780.05	mag ok
296	10/23/15	23:00:00	7.9	355.09	32	58.8733	N	158	12.0017	E	2499	40,809.44	mag ok
296	10/23/15	23:30:00	8.8	1.62	33	3.2023	N	158	12.0039	E	2960	40,764.64	mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
297	10/24/15	0:00:00	10.6	5.03	33	8.0626	N	158	12.0018	E	3188	40,640.24	mag ok
297	10/24/15	0:30:00	9.4	4.19	33	12.7799	N	158	11.997	E	3078	40,623.24	mag ok
297	10/24/15	1:00:00	8.9	2.58	33	17.5032	N	158	12.0027	E	3114	40,725.09	mag ok
297	10/24/15	1:30:00	9.7	3.64	33	21.6927	N	158	11.9965	E	3206.97	40,781.43	mag ok
297	10/24/15	2:00:00	9.6	353.96	33	26.1213	N	158	12.0021	E	3350.55	40,829.71	mag ok
297	10/24/15	2:30:00	9.6	357.42	33	30.7109	N	158	12.0031	E	3861.76	40,935.22	mag ok
297	10/24/15	3:00:00	9.3	355.78	33	35.4347	N	158	11.9925	E	3647.7	41,014.48	mag ok
297	10/24/15	3:30:00	10.2	359.82	33	39.6767	N	158	12.0028	E	3859.97	40,975.44	mag ok
297	10/24/15	4:00:00	10.5	0.88	33	44.5106	N	158	12.0011	E	4052.88	40,937.75	mag ok
297	10/24/15	4:35:00	9	359.48	33	50.1231	N	158	11.9976	E	4214	40,920.90	mag ok
297	10/24/15	5:00:00	10.2	1.79	33	54.0511	N	158	12.0039	E	4300	40,971.49	mag ok
297	10/24/15	5:30:00	10	1.53	33	58.8769	N	158	12.0027	E	4294	41,306.12	mag ok
297	10/24/15	6:00:00	8.5	1.89	34	3.728	N	158	12.0049	E	4333	41,361.87	mag ok
297	10/24/15	6:30:00	10.5	2.57	34	8.612	N	158	12.0022	E	4354	41,461.90	mag ok
297	10/24/15	7:00:00	9.5	3.51	34	13.345	N	158	12.0069	E	4273	41,539.67	mag ok
297	10/24/15	7:30:00	9	355.98	34	18.317	N	158	11.9961	E	4780	41,438.02	mag ok
297	10/24/15	8:00:00	9.7	7.83	34	22.7389	N	158	12.0051	E	4355	41,361.56	mag ok
297	10/24/15	8:30:00	9.9	359.7	34	27.4322	N	158	11.9969	E	4207	41,270.55	mag ok
297	10/24/15	9:00:00	9.8	358.97	34	32.0085	N	158	11.9997	E	4399	41,156.33	mag ok
297	10/24/15	9:30:00	10.2	357.29	34	36.6415	N	158	12.0022	E	4696	41,131.55	mag ok
297	10/24/15	10:00:00	10.5	6.28	34	41.3785	N	158	12.0049	E	4877	41,584.39	mag ok
297	10/24/15	10:30:00	10.1	0.04	34	47.0634	N	158	11.9996	E	4815	41,645.60	mag ok
297	10/24/15	11:00:00	9.8	1.58	34	51.5972	N	158	12.003	E	5249	41,566.01	mag ok
297	10/24/15	11:30:00	9.1	4.84	34	56.1988	N	158	12.0097	E	5171	41,668.60	mag ok
297	10/24/15	12:00:00	9.1	357.83	35	1.3375	N	158	12.0059	E	4914	41,902.82	mag ok
297	10/24/15	12:30:00	9.5	0.01	35	5.8931	N	158	12.0003	E	5067	41,980.73	mag ok
297	10/24/15	13:00:00	9.1	355.11	35	10.9945	N	158	12.0113	E	5021	41,995.66	mag ok
297	10/24/15	13:18:00											mag sampling turned off end of line 8, incrmnt to line cnt. 228. SV used turned yellow =1531.60 magE recovered n/a n/a n/a n/a n/a
297	10/24/15	13:29:00	3.3	347.25	35	14.7536	N	158	12.0342	E	4926		
297	10/24/15	13:30:00	4.4	7.7	35	15.1508	N	158	12.0307	E	4928.41	n/a	
297	10/24/15	14:00:00	9.4	233.92	35	14.1878	N	158	8.3742	E	4978.24	n/a	
297	10/24/15	14:30:00	9.7	229.8	35	10.8108	N	158	3.827	E	4999.16	n/a	
297	10/24/15	15:00:00	10.1	242.24	35	8.115	N	157	59.1409	E	5074.93	n/a	
297	10/24/15	15:30:00	10.2	232.13	35	5.1335	N	157	53.9717	E	5103.98	n/a	

297	10/24/15	16:00:00	9.7	230.39	35	2.3804	N	157	49.2452	E	5121.97	n/a	n/a
297	10/24/15	16:30:00	10	234.39	34	59.4705	N	157	44.2053	E	5111	n/a	n/a
297	10/24/15	17:00:00	9.5	240.26	34	56.4311	N	157	38.9612	E	4702	n/a	n/a
297	10/24/15	17:30:00	10.5	240.01	34	53.7009	N	157	34.2746	E	5014	n/a	n/a
297	10/24/15	18:00:00	11	231.93	34	50.8146	N	157	29.306	E	5118	n/a	n/a
297	10/24/15	18:30:00	10.5	224.55	34	47.881	N	157	24.2612	E	5158	n/a	n/a
297	10/24/15	19:00:00	10.3	235.47	34	44.8801	N	157	19.094	E	5144	n/a	n/a
297	10/24/15	19:30:00	9.3	232.37	34	42.1237	N	157	14.3642	E	5048	n/a	n/a
297	10/24/15	20:00:00	10.5	236.92	34	39.1655	N	157	9.3093	E	4970	n/a	n/a
297	10/24/15	20:30:00	10.6	234.45	34	35.7257	N	157	3.3665	E	5239	n/a	n/a
297	10/24/15	21:00:00	10.4	236.51	34	33.4751	N	156	59.5207	E	5188	n/a	n/a
297	10/24/15	21:30:00	10.8	222.53	34	30.3947	N	156	54.272	E	5304	n/a	n/a
297	10/24/15	22:00:00	10.4	236.1	34	27.4341	N	156	49.1931	E	5314	n/a	n/a
297	10/24/15	22:30:00	9.5	237.15	34	24.7024	N	156	44.5096	E	5306	n/a	n/a
297	10/24/15	23:00:00	10.4	235.78	34	21.6555	N	156	39.2878	E	5384	n/a	n/a
297	10/24/15	23:30:00	9.5	234.96	34	18.8055	N	156	34.4126	E	5477	n/a	n/a

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
298	10/25/15	0:00:00	9.7	235.82	34	16.1344	N	156	29.8436	E	5492	n/a	n/a
298	10/25/15	0:30:00	10.3	237.52	34	13.2426	N	156	24.9192	E	5505	n/a	n/a
298	10/25/15	1:00:00	10.5	237.76	34	10.1648	N	156	19.6519	E	5539	n/a	n/a
298	10/25/15	1:30:00	9.7	235.63	34	7.0327	N	156	14.3088	E	5578	n/a	n/a
298	10/25/15	2:00:00	10.4	234.82	34	4.1381	N	156	9.3781	E	5621	n/a	n/a
298	10/25/15	2:30:00	9.6	233.85	34	1.5508	N	156	4.9736	E	5633	n/a	n/a
298	10/25/15	3:00:00	9.7	241.14	33	58.7122	N	156	0.1518	E	5690.32	n/a	n/a
298	10/25/15	3:30:00	9.6	232.1	33	55.9459	N	155	55.4298	E	5719.9	n/a	n/a
298	10/25/15	4:00:00	9.5	227.48	33	53.2031	N	155	50.7684	E	5748.06	n/a	n/a
298	10/25/15	4:30:00	9.5	240.8	33	50.5053	N	155	46.1324	E	5757	n/a	n/a
298	10/25/15	5:00:00	9.5	226.06	33	47.7891	N	155	41.5525	E	5781	n/a	n/a
298	10/25/15	5:30:00	5.6	137.12	33	44.6645	N	155	39.3921	E	5802	n/a	n/a
													beginning to deploy Falkor's Maggie- different magnetometer than the one previously used- turning towards line
298	10/25/15	6:00:00	5.5	151.37	33	41.0971	N	155	41.305	E	5802	n/a	14
298	10/25/15	6:02:30											Maggie deployed
298	10/25/15	6:04:00											Maggie turned on
298	10/25/15	6:04:45											First data received from Maggie
298	10/25/15	6:06:00	7.8	143.32	33	40.0843	N	155	41.8688	E	5797	41,644.56	Last data spike came through
298	10/25/15	6:30:00	10	140.45	33	37.4	N	155	43.7277	E	5788	41,564.25	mag ok after some initial spikes
298	10/25/15	7:00:00	10.3	139.9	33	33.1038	N	155	46.8867	E	5759	41,500.44	mag ok
298	10/25/15	7:19:00 AM			33	29.943		155	47.969				start of line 14; line count incremented to 0246
298	10/25/15	7:30:00	9.3	184.52	33	28.235	N	155	47.9915	E	5741	41,357.06	mag ok; spikes in the data
298	10/25/15	8:00:00	9.9	168.83	33	23.3948	N	155	48.008	E	5722	41,235.19	mag ok; spikes in the data
298	10/25/15	8:30:00	9.4	182.42	33	18.3355	N	155	48.1028	E	5643	41,305.02	mag ok; spikes in the data
298	10/25/15	9:00:00	10	175.93	33	13.1291	N	155	47.9951	E	5511	41,380.08	mag ok
298	10/25/15	9:30:00	10.3	183.54	33	8.3058	N	155	47.9971	E	5438	41,009.35	mag ok
298	10/25/15	10:00:00	10.1	173.97	33	3.582	N	155	47.9989	E	5366	40,789.62	mag ok
298	10/25/15	10:45:00	9.8	187.24	32	55.5012	N	155	48.0009	E	5141	40,853.92	mag ok
298	10/25/15	11:00:00	10.3	183.41	32	53.393	N	155	48.0058	E	5082	40,945.19	mag ok
298	10/25/15	11:30:00	9.8	186.8	32	48.1273	N	155	48.0024	E	4956	40,994.04	mag ok
298	10/25/15	12:00:00	9.9	180.54	32	43.4523	N	155	48.0008	E	4804	41,039.47	mag ok
298	10/25/15	12:30:00	10.8	188.78	32	38.0742	N	155	48.0071	E	4656	40,994.38	mag ok
298	10/25/15	13:00:00	9.2	192.36	32	33.1325	N	155	48.0111	E	4570	40,931.12	mag ok
298	10/25/15	13:30:00	10.8	182.4	32	28.0521	N	155	47.9961	E	4544.2	40,737.25	mag ok
298	10/25/15	14:00:00	10.3	188.44	32	22.4644	N	155	48.0106	E	4529.64	40,637.64	mag ok
298	10/25/15	14:30:00	10.3	173.43	32	17.8999	N	155	48.0019	E	4528.04	40,689.16	mag ok
298	10/25/15	15:00:00	9.9	187.96	32	12.8373	N	155	48.003	E	4522.26	40,750.51	mag ok
298	10/25/15	15:30:00	10.6	180.83	32	8.0682	N	155	47.9894	E	4518.42	40,697.59	mag ok
298	10/25/15	16:00:00	10.5	189.16	32	3.0793	N	155	48.0038	E	4535.92	40,528.64	mag ok
298	10/25/15	16:30:00	10.8	185.77	31	57.916	N	155	47.9991	E	4553	40,422.96	mag ok
298	10/25/15	17:00:00	10.4	172.42	31	53.0086	N	155	47.9926	E	4536	40,361.70	mag ok
298	10/25/15	17:30:00	10.5	182.72	31	48.2232	N	155	48.006	E	4507	40,481.03	mag ok
298	10/25/15	18:00:00	10.2	179.8	31	43.3799	N	155	47.9896	E	4503	40,654.71	mag ok

298	10/25/15	18:30:00	9.6	180.22	31	38.4598	N	155	47.9922	E	4650	40,477.92	mag ok
298	10/25/15	19:00:00	10	171.81	31	33.845	N	155	48.0004	E	4705	40,163.65	mag ok
298	10/25/15	19:30:00	9.6	170.99	31	28.0235	N	155	48.0018	E	4761	40,255.22	mag ok
298	10/25/15	20:00:00	9.5	180.05	31	24.8268	N	155	47.9969	E	4780	40,312.67	mag ok
298	10/25/15	20:30:00	9.9	198.03	31	20.4644	N	155	47.9939	E	4820	40,582.68	mag ok
298	10/25/15	21:00:00	8.2	171.31	31	15.8198	N	155	48.0153	E	4849	40,455.54	mag ok
298	10/25/15	21:30:00	8.1	181.23	31	10.4771	N	155	48.0095	E	4892	40,191.21	mag ok
298	10/25/15	22:00:00	8.2	178.19	31	7.9175	N	155	48.0021	E	4888	39,983.63	mag ok
298	10/25/15	22:45:00	7.8	194.72	31	2.2843	N	155	47.9999	E	4969	40,168.49	msg ok
298	10/25/15	23:00:00	8.7	197.1	31	0.3621	N	155	48.0022	E	5023	40,316.61	mag ok
298	10/25/15	23:30:00	8.4	176.94	30	56.2244	N	155	48.0053	E	5330	40,536.73	mag ok
299	10/26/15	0:00:00	7.5	183.11	30	52.0951	N	155	48.0042	E	5532	40,124.32	mag ok
finished line 0014; manually													
299	10/26/15	0:13:00	7.5	205.4	30	49.5095	N	155	47.5276	E	5522	40,000.81	0263; mag ok
299	10/26/15	0:30:00	8.3	210.2	30	48.2376	N	155	46.4365	E	5561	39,961.80	mag ok
299	10/26/15	1:00:00	7.79	214.7	30	45.2032	N	155	44.2914	E	5648	39,964.51	mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
299	10/26/15	0:00:00	7.5	183.11	30	52.0951	N	155	48.0042	E	5532	40,124.32 mag ok	
299	10/26/15	0:13:00	7.5	205.4	30	49.5095	N	155	47.5276	E	5522	40,000.81 0263; mag ok	finished line 0014; manually increment line cnt. From 0262 to 0263
299	10/26/15	0:30:00	8.3	210.2	30	48.2376	N	155	46.4365	E	5561	39,961.80 mag ok	
299	10/26/15	1:00:00	7.79	214.7	30	45.2032	N	155	44.2914	E	5648	39,964.51 mag ok	
299	10/26/15	1:30:00	9.5	217.45	30	41.278	N	155	41.494	E	5662.88	39,994.82 mag ok	
299	10/26/15	2:00:00	8.5	215.82	30	38.0229	N	155	39.0779	E	5704	39,953.94 mag ok	
299	10/26/15	2:30:00	9.3	206.89	30	34.6581	N	155	36.6093	E	5704.54	39,948.45 mag ok	
299	10/26/15	3:00:00	8.4	213.99	30	30.9833	N	155	33.8878	E	5702.31	39,930.21 mag ok	
299	10/26/15	3:30:00	8.2	214.69	30	27.8322	N	155	31.5742	E	5666.93	39,939.49 mag ok	
299	10/26/15	4:00:00	7.9	212.61	30	24.4994	N	155	29.1183	E	5710.33	39,962.83 mag ok	
299	10/26/15	4:30:00	7.8	220.94	30	20.9966	N	155	26.5402	E	5730	39,998.51 mag ok	
299	10/26/15	5:00:00	8.7	215.04	30	17.6408	N	155	24.0873	E	5740	39,994.26 mag ok	
299	10/26/15	5:30:00	8.5	229	30	14.3252	N	155	21.637	E	5756	39,936.45 mag ok	
299	10/26/15	6:00:00	7.8	197.07	30	11.0471	N	155	19.2223	E	5758	39,872.48 mag ok	
299	10/26/15	6:30:00	8.6	216.88	30	7.7031	N	155	16.768	E	5743	39,795.61 mag ok	
299	10/26/15	7:00:00	8.8	202.98	30	4.2685	N	155	14.2392	E	5794	39,779.35 mag ok	
299	10/26/15	7:30:00	8.4	211.04	30	0.8994	N	155	11.6066	E	5796	39,676.59 mag ok	
299	10/26/15	8:00:00	8.6	218.05	29	57.278	N	155	9.1234	E	5803	39,804.00 mag ok	
299	10/26/15	8:30:00	7.8	225.21	29	53.824	N	155	6.5933	E	5750	39,793.46 mag ok	turning bold to the North back toward survey/ultibeam data overlaps
299	10/26/15	8:35:00			29	53.4906	N	155	5.9909	E			
299	10/26/15	9:00:00	6.3	340.96	29	55.9975	N	155	5.1775	E	5795	39,803.45 mag ok	
299	10/26/15	9:30:00	6	345.4	29	58.8016	N	155	4.311	E	5776	39,827.59 mag ok, 1 spike in maggy	
299	10/26/15	10:00:00	6.8	348.65	30	1.8627	N	155	3.3622	E	6060	39,826.51 mag ok	
299	10/26/15	10:30:00	6.5	325.35	30	5.1359	N	155	2.3554	E	5781	39,777.73 mag ok	
299	10/26/15	11:00:00	6.2	344.51	30	8.1016	N	155	1.4255	E	5813	39,758.21 mag ok	
299	10/26/15	11:18:50	6.3	342.54	30	9.9815	N	155	0.844	E	5831	39,759.62 spike in magnetic data	
299	10/26/15	11:30:00	6.4	339.37	30	10.5547	N	155	0.6625	E	5824	39,767.68 mag ok	
299	10/26/15	12:00:00	7.5	334.37	30	13.8251	N	154	59.6331	E	5826	39,836.84 mag ok	
299	10/26/15	12:30:00	5.2	351.7	30	16.4464	N	154	58.8442	E	5833	39,910.63 mag ok	
299	10/26/15	13:00:00	5.9	341.89	30	19.4712	N	154	57.8996	E	5818	39,963.30 mag ok	another possible shark bite on the magE
299	10/26/15	13:22:00											
299	10/26/15	13:30:00	6	349.6	30	22.5707	N	154	56.9405	E	5787.73	39,959.55 mag ok	
299	10/26/15	14:00:00	7.1	327.92	30	25.7021	N	154	55.9556	E	5974.12	40,006.53 more possible shark bites	
299	10/26/15	14:30:00	5.5	350.15	30	29.2515	N	154	54.8477	E	5765	40,102.26 mag ok	
299	10/26/15	15:00:00	7.5	355.13	30	31.94	N	154	54.019	E	5763.71	40,166.69 mag ok	
299	10/26/15	15:30:00	7.1	344.24	30	35.1264	N	154	53.0333	E	5734.08	40,208.90 mag ok	
299	10/26/15	16:00:00	7.4	340.46	30	38.4218	N	154	52.0059	E	5738.3	40,243.88 mag ok	
299	10/26/15	16:30:00	6.5	344.13	30	41.7202	N	154	50.981	E	5704	40,283.77 another large single mag spike 16:04	
299	10/26/15	17:00:00	6.5	340.55	30	45.0156	N	154	49.9515	E	5705	40,330.00 mag ok	
299	10/26/15	17:30:00	6.7	346.63	30	48.1818	N	154	48.9633	E	5692	40,344.53 mag ok	
299	10/26/15	18:00:00	7	349.93	30	51.2343	N	154	48.0082	E	5672	40,322.71 mag ok	

299	10/26/15	18:30:00	6.4	353.1	30	54.3163	N	154	47.0461	E	5687	40,333.97	mag ok
299	10/26/15	19:00:00	6.3	337.51	30	57.4031	N	154	46.0827	E	5661	40,328.31	mag ok
299	10/26/15	19:30:00	7.3	356.82	31	0.4865	N	154	45.1102	E	5662	40,316.53	mag ok
299	10/26/15	20:00:00	7.3	355.04	31	3.5003	N	154	44.1574	E	5652	40,335.00	mag ok
299	10/26/15	20:30:00	6.4	346.62	31	6.7794	N	154	43.1379	E	5638	40,380.89	mag ok
299	10/26/15	21:00:00	6.1	347.55	31	9.7251	N	154	42.2169	E	5790	40,412.11	mag ok
299	10/26/15	21:30:00	5.6	331.16	31	12.9327	N	154	41.2116	E	5683	40,426.70	mag ok
299	10/26/15	22:00:00	5.5	350.27	31	15.6037	N	154	40.3674	E	5680	40,436.17	mag ok
299	10/26/15	22:45:00	6.2	352.61	31	20.0054	N	154	38.9908	E	5670	40,477.71	mag ok
299	10/26/15	23:00:00	5.5	357.95	31	21.156	N	154	38.6364	E	5637	40,486.33	mag ok
299	10/26/15	23:30:00	6.4	341.47	31	24.221	N	154	37.6569	E	5636	40,516.01	mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
300	10/27/15	0:00:00	5.4	339.95	31	26.7302	N	154	36.8715	E	5637	40,544.67	mag ok
300	10/27/15	0:23:45	6.8	337.02	31	29.3056	N	154	36.0635	E	5629	40,568.84	start line 0017; manually changed
300	10/27/15	0:30:00	7.1	356.17	31	30.9746	N	154	36.0517	E	5620	40578.17	mag ok
300	10/27/15	1:00:00	6.4	359.74	31	33.1747	N	154	36.0119	E	5584	40,591.32	mag ok
300	10/27/15	1:30:00	7.2	356.08	31	36.4733	N	154	36.0035	E	5587	40,627.81	mag ok
300	10/27/15	2:00:00	6	356.03	31	39.8	N	154	36.0057	E	5534	40,725.75	mag ok
300	10/27/15	2:30:00	7.4	353.9	31	43.6443	N	154	36.0007	E	5430	40,908.91	mag ok
300	10/27/15	3:00:00	6.9	359.61	31	46.5439	N	154	36.0034	E	5350	41,140.21	mag ok
300	10/27/15	3:30:00	6.1	350.98	31	50.0789	N	154	36	E	5228	41,032.60	mag ok
300	10/27/15	4:00:00	8	11.05	31	53.1915	N	154	35.9999	E	5141	40,752.66	mag ok
300	10/27/15	4:33:00	8	357.78	31	56.8373	N	154	35.9981	E	4625	40,563.74	mag ok
300	10/27/15	5:00:00	7.3	355.82	31	59.9352	N	154	36.0002	E	4429	40,727.27	mag ok
300	10/27/15	5:30:00	6.7	3.99	32	3.2919	N	154	36.0085	E	4189	40,983.84	mag ok
300	10/27/15	6:00:00	7	356.61	32	6.7488	N	154	36.0072	E	3971	40,894.79	mag ok
300	10/27/15	6:30:00	6.5	0.86	32	10.1823	N	154	36.0091	E	4355	40,639.16	mag ok
300	10/27/15	7:00:00	6.3	1.63	32	13.5918	N	154	36.0103	E	4763	40,615.75	mag ok
300	10/27/15	7:30:00	7.3	5.59	32	17.1258	N	154	35.9976	E	4767	40,766.18	mag ok
300	10/27/15	8:00:00	6.1	4	32	20.7634	N	154	36.007	E	4777	40,946.76	mag ok
300	10/27/15	8:30:00	6.6	354.68	32	23.5812	N	154	36.0061	E	4804	40,925.31	mag ok
300	10/27/15	9:00:00	6.6	356.91	32	27.032	N	154	36.001	E	4792	40,996.90	mag ok
300	10/27/15	9:30:00	7.9	355.74	32	30.4195	N	154	36.0006	E	4814	41,029.66	mag ok
300	10/27/15	10:00:00	6.9	4.56	32	34.0899	N	154	35.9971	E	4861	40,952.73	mag ok
300	10/27/15	10:30:00	8.2	1.66	32	37.3636	N	154	35.9997	E	4942	40,751.95	mag ok
300	10/27/15	11:00:00	7.2	355.81	32	41.2452	N	154	35.9982	E	5092	40,898.36	mag ok
300	10/27/15	11:30:00	6.7	3.06	32	44.9001	N	154	36.0043	E	4759	41,120.59	mag ok
300	10/27/15	12:00:00	8.1	359.71	32	48.3112	N	154	35.9974	E	4797	41,236.34	mag ok
300	10/27/15	12:14:00	6.9	356.42	32	51.1721	N	154	35.607	E	5139	41,268.89	XBT 29 performed
300	10/27/15	12:30:00	7.2	358.12	32	51.8343	N	154	36.0034	E	5077	41,270.52	mag ok
300	10/27/15	13:00:00	6.4	0.57	32	54.9794	N	154	36.0072	E	5138	41,345.82	mag ok
300	10/27/15	13:30:00	6.2	8.13	32	58.9936	N	154	36.0021	E	5407.77	41,435.01	mag ok
300	10/27/15	14:00:00	8.3	10.14	33	1.8942	N	154	36.047	E	5458.79	41,295.15	mag ok
300	10/27/15	14:30:00	6.4	354.36	33	5.1718	N	154	36.0022	E	5462.29	41,105.77	mag ok
													mag ok, end of survey line 17, manually increase multibeam line
300	10/27/15	15:00:00	7.1	356.17	33	8.6397	N	154	36.0111	E	5481.81	41,148.74	count to 303,
300	10/27/15	15:30:00	8.1	60.04	33	11.1076	N	154	39.4791	E	5510.5	41,038.52	en route to survey line 16
300	10/27/15	16:04:00	8.5	65.4	33	13.3653	N	154	44.6565	E	5548	40,972.29	mag ok
300	10/27/15	16:30:00	8.2	61.5	33	14.9411	N	154	48.3373	E	5604	41,185.14	mag ok
300	10/27/15	17:00:00	8.6	67.76	33	16.7675	N	154	52.7574	E	5682	41,307.57	mag ok
													mag ok, SV Used alternating
300	10/27/15	17:30:00	8	66.62	33	18.6805	N	154	56.9517	E	5689	41,424.05	between yellow and red

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
301	10/28/15	0:00:00	8.8	175.16	32	26.0094	N	155	0.0116	E	4560	40,979.65 mag ok	
301	10/28/15	0:30:00	7.9	188.98	32	22.5842	N	154	59.9959	E	4539	40,967.80 mag ok	
301	10/28/15	1:00:00	7.2	179.74	32	18.7193	N	155	0.0033	E	4541	40,902.76 mag ok	
301	10/28/15	1:30:00	7.8	180.21	32	14.3655	N	155	0.016	E	4532	40,744.29 mag ok	
301	10/28/15	2:00:00	7.6	184.03	32	10.7841	N	155	0.0013	E	4516.5	40,690.30 mag ok	
301	10/28/15	2:30:00	6.8	199.31	32	7.344	N	155	0.044	E	4522	40,758.49 mag ok	
301	10/28/15	3:00:00	7.5	171.7	32	3.7347	N	155	0.0107	E	4485.27	40,782.19 mag ok	
301	10/28/15	3:30:00	7.7	181.49	31	59.5096	N	154	59.994	E	4470.07	40,461.99 mag ok	
301	10/28/15	4:00:00	7.3	176.5	31	55.9694	N	155	0.0032	E	4487.01	40,140.91 mag ok	
301	10/28/15	4:30:00	8	173.16	31	51.911	N	154	59.9914	E	4599	40,525.08 mag ok	
301	10/28/15	5:00:00	7.7	180.6	31	48.0435	N	155	0.0153	E	4584	40,690.15 mag ok	
301	10/28/15	5:30:00	7	182.37	31	44.0624	N	154	59.9955	E	4806	40,690.44 mag ok	
301	10/28/15	6:00:00	7.5	178.44	31	40.2055	N	155	0.0054	E	4821	40,700.02 mag ok	
301	10/28/15	6:30:00	7.5	184.37	31	36.4644	N	155	0.0026	E	4865	40,569.32 mag ok	
301	10/28/15	7:00:00	6.9	184.11	31	32.7489	N	154	59.9955	E	5004	40,571.18 mag ok	
301	10/28/15	7:30:00	6.8	178.04	31	29.0706	N	154	59.9972	E	5091	41,198.16 mag ok	
301	10/28/15	8:00:00	7.4	182.3	31	25.8053	N	154	59.993	E	5303	41,220.91 mag ok	
301	10/28/15	8:30:00	7.2	176.4	31	21.8623	N	155	0.0001	E	5428	40,672.94 mag ok	
											end of line 16; incremented line count to 0321; mag bad weather line archived; new mag survey started		
301	10/28/15	8:30:00			31	21.4458	N	154	59.9997	E	5441	40,645.63 FK151005_TAMU_Turn_1615	
301	10/28/15	9:00:00	8.2	134.32	31	19.0314	N	155	2.2673	E	5407	40,586.28 mag ok	
301	10/28/15	9:30:00	8.1	135.4	31	16.0577	N	155	5.6572	E	5343	40,472.44 mag ok	
301	10/28/15	10:00:00	7.5	135.7	31	13.4523	N	155	8.6553	E	5402	40,325.56 mag ok	
301	10/28/15	10:30:00	7.8	139.09	31	10.4288	N	155	11.5267	E	5497	40,147.63 mag ok	
301	10/28/15	11:00:00	7.19	141.04	31	7.3138	N	155	14.4557	E	5464	40,081.27 mag ok	
301	10/28/15	11:30:00	7.9	142.42	31	4.5642	N	155	17.0542	E	5479	40,111.07 mag ok	
301	10/28/15	12:00:00	7.8	139.24	31	2.3452	N	155	18.0235	E	5463	40,111.35 mag ok	
											start line 0015; increment from line cnt. 0324 to 0325 per bridge; FK151005_TAMU_Line_015		
301	10/28/15	12:22:45	7.8	137.76	30	59.4037	N	155	21.9149	E	5457	40,100.77 created	
301	10/28/15	12:30:00	6.8	95.84	30	59.0669	N	155	22.6063	E	5465	40,092.33 mag ok	
301	10/28/15	13:00:00	8.3	5.33	31	3.5337	N	155	24.0026	E	5452.6	40,093.62 mag ok	
301	10/28/15	13:30:00	8.2	352.85	31	6.9551	N	155	24.0023	E	5392.02	40,038.11 mag ok	
301	10/28/15	14:00:00	9	3.51	31	10.9292	N	155	24.0043	E	5286.98	40,236.91 mag ok	
301	10/28/15	14:30:00	8.7	358.5	31	15.0407	N	155	24.0029	E	5127.93	40,581.34 mag ok	
301	10/28/15	15:00:00	8.7	355.27	31	19.2184	N	155	24.0005	E	5100.11	40,832.99 mag ok	
301	10/28/15	15:30:00	8	9.55	31	23.8681	N	155	24.0021	E	5079.53	40,975.25 mag ok	
301	10/28/15	16:00:00	8.3	2.16	31	27.2586	N	155	24.0083	E	4903.23	40,622.44 mag ok	
301	10/28/15	16:30:00	8	6.49	31	31.4452	N	155	24.0058	E	4821	40,338.93 mag ok	

301	10/28/15	17:00:00	8.4	1.97	31	35.2852	N	155	24.0009	E	4780	40,507.04 mag ok
301	10/28/15	17:30:00	8	350.35	31	39.2197	N	155	24.0062	E	4773	40,499.79 mag ok
301	10/28/15	18:00:00	8	7	31	43.0984	N	155	24.0053	E	4722	40,471.97 mag ok
301	10/28/15	18:30:00	8.2	348.03	31	47.1194	N	155	24.0072	E	4665	40,544.39 mag ok
301	10/28/15	19:00:00	7.8	355.15	31	51.0294	N	155	24.0088	E	4542	40,541.28 mag ok
301	10/28/15	19:30:00	7.6	344.65	31	54.6419	N	155	24.0058	E	4563	40,563.00 mag ok
301	10/28/15	20:00:00	7.6	356.89	31	58.4081	N	155	24.0102	E	4567	40,434.09 mag ok
301	10/28/15	20:30:00	7.7	359.71	32	2.3587	N	155	23.9944	E	4561	40,501.07 mag ok
301	10/28/15	21:00:00	8	350.91	32	5.8481	N	155	23.9982	E	4534	40,584.96 mag ok
301	10/28/15	21:30:00	8	0.96	32	10.024	N	155	23.9993	E	4506	40,677.58 mag ok
301	10/28/15	22:00:00	7.8	350.76	32	13.4942	N	155	24.0051	E	4490	40,757.65 mag ok
301	10/28/15	22:30:00	7.4	345.08	32	17.3829	N	155	24.0054	E	4454	40,813.30 mag ok
301	10/28/15	23:00:00	7.4	3.94	32	21.3534	N	155	24.0018	E	4474	40,846.71 mag ok
301	10/28/15	23:30:00	7.8	0.46	32	25.3801	N	155	23.9889	E	4581	40,916.96 mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
302	10/29/15	0:00:00	7.8	3.89	32	28.8271	N	155	23.9987	E	4589	41,077.77	mag ok
302	10/29/15	0:30:00	8.1	1.57	32	32.9536	N	155	23.9937	E	3972	41,019.85	mag ok
302	10/29/15	1:00:00	7.8	6.98	32	36.8909	N	155	23.9918	E	4366	40,817.63	mag ok
302	10/29/15	1:30:00	7.1	2.77	32	40.8208	N	155	23.9952	E	4683	41,017.05	mag ok
302	10/29/15	2:00:00	7.8	3.43	32	44.6436	N	155	23.9917	E	4676	41,076.60	mag ok
302	10/29/15	2:30:00	8.8	6.02	32	48.9198	N	155	24.0018	E	4807.28	40,959.93	mag ok
302	10/29/15	3:00:00	8.5	345.87	32	52.5977	N	155	23.9987	E	4588.76	40,921.83	mag ok
302	10/29/15	3:30:00	7.4	348.96	32	56.7746	N	155	23.9949	E	4731.96	40,892.51	mag ok
302	10/29/15	4:00:00	8	7.71	33	0.5834	N	155	24.002	E	5265.48	40,993.39	mag ok
302	10/29/15	4:30:00	7.5	358.45	33	4.917	N	155	23.9933	E	5401	40,943.64	mag ok
302	10/29/15	5:00:00	8.5	3.5	33	9.1649	N	155	24.003	E	5477	41,210.70	mag ok
302	10/29/15	5:30:00	8.7	6.22	33	13.3938	N	155	24.0017	E	5528	41,239.60	mag ok
302	10/29/15	6:00:00	8.5	3.17	33	17.4805	N	155	23.9979	E	5637	41,142.27	mag ok
302	10/29/15	6:30:00	8	1.36	33	21.6454	N	155	23.9974	E	5677	41,258.38	mag ok
													end of line 15, increment line from 343 to 344
302	10/29/15	6:59:00			33	25.6262	N	155	24.1333	E			
302	10/29/15	7:00:00	8.5	27.74	33	25.8405	N	155	24.2947	E	5767	41,514.53	mag ok, turning
302	10/29/15	7:30:00	8.7	68.42	33	27.3663	N	155	28.5441	E	5816	41,555.76	mag ok, turning
302	10/29/15	8:00:00	8	70.77	33	28.9048	N	155	32.8864	E	5815	41,564.32	mag ok, turning
302	10/29/15	8:30:00	7.4	84.88	33	30.2436	N	155	36.7629	E	5801	41,560.88	mag ok, turning
302	10/29/15	9:00:00	7.7	80.95	33	31.7244	N	155	41.2334	E	5793	41,549.46	mag ok, turning
302	10/29/15	9:30:00	7.8	65.88	33	33.1242	N	155	45.3159	E	5778	41,510.68	mag ok, turning
302	10/29/15	10:00:00	8.4	61.56	33	34.5154	N	155	49.4089	E	5760	41,487.74	mag ok, turning
302	10/29/15	10:30:00	7.3	52.76	33	36.2172	N	155	54.327	E	5741	41,478.28	mag ok
302	10/29/15	11:00:00	7.5	49.76	33	37.5545	N	155	58.238	E	5714	41,431.78	mag ok
302	10/29/15	11:30:00	8.6	56.67	33	39.1215	N	156	2.8281	E	5696	41,407.30	mag ok
302	10/29/15	12:00:00	8.8	61.9	33	40.6552	N	156	7.308	E	5657	41,388.56	mag ok
													FK151005_Tamu_line_ start line 0013; increment from line
302	10/29/15	12:22:47	7.4	92.87	33	41.7752	N	156	10.9992	E	5658	41,366.03	013 created
302	10/29/15	12:30:00	6.9	188.26	33	40.9335	N	156	11.8201	E	5646	41,364.60	mag ok
													start line 0013; increment from line
302	10/29/15	12:44:09	8.1	181.83	33	39.4535	N	156	12.0006	E	5658	41,362.07	cnt. 0349 to 0350
302	10/29/15	13:00:00	8.3	182.3	33	37.8875	N	156	12.0059	E	5654	41,338.65	mag ok
302	10/29/15	13:30:00	7.5	178.91	33	33.8302	N	156	11.9972	E	5639.71	41,248.26	mag ok
302	10/29/15	14:00:00	8.5	177.93	33	29.9593	N	156	11.9963	E	5591	41,222.71	mag ok
302	10/29/15	14:30:00	8.3	164.44	33	25.7731	N	156	12.0015	E	5509.79	41,315.03	mag ok
302	10/29/15	15:00:00	6.2	188.86	33	22.0123	N	156	12.0009	E	5473.03	41,456.68	mag ok
302	10/29/15	15:30:00	7.4	171.36	33	18.3803	N	156	12.0063	E	5414.01	41,398.25	mag ok

302	10/29/15	16:04:00	7.8	186.42	33	14.1239	N	156	12.0063	E	5424	41,107.24 mag ok
302	10/29/15	16:30:00	8.1	186.44	33	10.7001	N	156	12.0036	E	5386	40,920.61 mag ok
302	10/29/15	17:00:00	6.7	176.2	33	7.0153	N	156	11.9949	E	5360	40,838.82 mag ok
302	10/29/15	17:30:00	7.5	184.8	33	3.2933	N	156	11.9999	E	5335	40,866.95 mag ok
302	10/29/15	18:00:00	8.2	180.87	32	59.2436	N	156	12	E	5157	40,841.46 mag ok
302	10/29/15	18:30:00	8.1	182.63	32	55.1084	N	156	12.0102	E	5142	40,818.30 mag ok
302	10/29/15	19:00:00	8.7	177.52	32	50.827	N	156	12.0056	E	5000	40,877.26 mag ok
302	10/29/15	19:30:00	8.1	188.36	32	46.4654	N	156	12.0032	E	4928	40,888.10 mag ok
302	10/29/15	20:00:00	8.6	187.02	32	42.4241	N	156	12.0059	E	4996	40,857.73 mag ok
302	10/29/15	20:30:00	8.4	189.12	32	38.2628	N	156	12.016	E	5002	40,722.30 mag ok
302	10/29/15	21:00:00	8	175.78	32	34.0228	N	156	12.0078	E	4904	40,659.73 mag ok
302	10/29/15	21:30:00	8.5	179.34	32	29.7966	N	156	12.0184	E	4834	40,576.08 mag ok
302	10/29/15	22:00:00	7.7	176.28	32	25.912	N	156	12.017	E	4763	40,391.50 mag ok
302	10/29/15	22:30:00	8.4	180.02	32	21.8308	N	156	12.0146	E	4652	40,300.45 mag ok
302	10/29/15	23:00:00	7.6	190.62	32	17.9481	N	156	12.0175	E	4536	40,294.27 mag ok
302	10/29/15	23:30:00	8.2	181.16	32	13.7711	N	156	11.9927	E	4432	40,415.82 mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
303	10/30/15	0:00:00	7.9	173.4	32	9.6571	N	156	12.042	E	4342	40,508.12	mag ok
303	10/30/15	0:30:00	8.2	175.75	32	5.6539	N	156	11.9953	E	4242	40,620.79	mag ok
303	10/30/15	1:00:00	8.4	183.67	32	1.8056	N	156	12.0122	E	4231	40,872.01	mag ok
303	10/30/15	1:30:00	8.6	182.99	31	57.5291	N	156	12.0067	E	4023.87	40,657.80	mag ok
303	10/30/15	2:00:00	8.7	184.63	31	53.4914	N	156	12.0099	E	4253.72	40,647.30	mag ok
303	10/30/15	2:30:00	8.2	172.31	31	49.7122	N	156	12.0031	E	4234.15	40,613.87	mag ok
303	10/30/15	3:00:00	8.5	190.19	31	45.9659	N	156	11.9676	E	4211.13	40,433.47	mag ok
303	10/30/15	3:30:00	7.8	174.78	31	41.8032	N	156	12.01	E	4218.47	39,931.63	mag ok
303	10/30/15	4:00:00	8.1	181.98	31	37.8226	N	156	12.0033	E	4275.61	40,115.21	mag ok
303	10/30/15	4:30:00	7.4	176.71	31	33.2646	N	156	12.0375	E	4345	40,216.95	mag ok
303	10/30/15	5:00:00	8.5	174.93	31	29.7	N	156	11.9918	E	4380	40,281.15	mag ok heave, pitch and roll went down for a couple minutes (5:06 to 5:08), multi-beam carried on
303	10/30/15	5:08:00			31	28.4324	N	156	11.9942	E			mag ok, multi-beam
303	10/30/15	5:30:00	8.5	169	31	25.5362	N	156	12	E	4425	40,370.36	appears ok
303	10/30/15	6:00:00	8	184.56	31	21.4907	N	156	12.003	E	4497	40,400.92	mag ok
303	10/30/15	6:30:00	7.8	174.45	31	17.4927	N	156	12	E	4561	40,359.91	mag ok
303	10/30/15	7:00:00	7.8	179.49	31	13.4632	N	156	12.0089	E	4626	40,356.64	mag ok
303	10/30/15	7:30:00	7.6	176.29	31	9.9132	N	156	11.9931	E	4672	40,300.19	mag ok
303	10/30/15	8:00:00	7.6	182.82	31	5.936	N	156	12.006	E	4727	40,236.48	mag ok
303	10/30/15	8:30:00	8.2	181.18	31	1.8882	N	156	12.0023	E	4758	40,201.38	mag ok
303	10/30/15	9:00:00	8.5	179.88	30	57.0044	N	156	1.0015	E	4799	40,000.23	mag ok
303	10/30/15	9:30:00	8.3	176.1	30	52.6788	N	156	12.0024	E	4800	39,716.19	mag ok
303	10/30/15	10:00:00	7.8	176.11	30	49.2816	N	156	12.0074	E	4933	39,676.52	mag ok
303	10/30/15	10:30:00	7.8	174.7	30	45.4901	N	156	12.0062	E	5047	39,994.89	mag ok
303	10/30/15	11:00:00	8.2	174.46	30	41.5106	N	156	11.996	E	5291	40,478.92	mag ok
303	10/30/15	11:30:00	8.6	174.14	30	37.3252	N	156	12.0004	E	5449	40,143.42	mag ok finish line 013; increment from line
303	10/30/15	11:54:05	8.5	180.12	30	33.5298	N	156	11.9922	E	5464	39,844.85	cnt. 0373 to 0374
303	10/30/15	12:00:00	8.4	163.23	30	33.0945	N	156	12.0201	E	5463	39,828.08	mag ok
303	10/30/15	12:30:00	7.6	136.74	30	30.8669	N	156	15.2009	E	5486	39,755.21	mag ok
303	10/30/15	13:00:00	7.5	142.35	30	28.6163	N	156	18.4717	E	5499	39,696.06	mag ok
303	10/30/15	13:30:00	6.5	129.74	30	26.1668	N	156	22.018	E	5537	39,639.09	mag ok
303	10/30/15	14:00:00	6.9	139.19	30	24.2657	N	156	24.7915	E	5551.44	39,598.06	mag ok
303	10/30/15	14:30:00	6.6	123.72	30	22.0345	N	156	28.0296	E	5552.42	39,557.36	mag ok
303	10/30/15	15:00:00	7.2	135.53	30	19.9211	N	156	31.111	E	5552.27	39,493.29	mag ok

303	10/30/15	15:30:00	6.8	99.01	30	17.6593	N	156	34.6343	E	5630.42	39,441.33 mag ok begin line 12; increment to line cnt. 378. Create new mag survey
	10/30/15	15:46:00	9.2	3.36	30	19.0502	N	156	35.7428	E	5589.25	FK151005_Tamu_Line 39,471.07 _012
303	10/30/15	16:00:00	8.9	357.2	30	20.7979	N	156	36.0328	E	5578.03	39,564.07 mag ok
303	10/30/15	16:30:00	8.2	357.89	30	25.2629	N	156	36.0047	E	5340	39,992.42 mag ok
303	10/30/15	17:00:00	8.4	359.42	30	29.3664	N	156	36.0028	E	5001	40,356.06 mag ok
303	10/30/15	17:30:00	8.5	359.89	30	33.5338	N	156	36.0104	E	4934	39,962.03 mag ok
303	10/30/15	18:00:00	7.8	6.15	30	37.6342	N	156	35.9986	E	4870	39,688.92 mag ok
303	10/30/15	18:30:00	7.9	356.09	30	42.0044	N	156	36.0071	E	4846	39,615.58 mag ok
303	10/30/15	19:00:00	8	2.81	30	45.9782	N	156	36.0076	E	4837	39,640.97 mag ok
303	10/30/15	19:30:00	7.9	355.12	30	50.1915	N	156	36.009	E	4812	39,766.19 mag ok
303	10/30/15	20:00:00	8.1	3.29	30	53.8018	N	156	36.0042	E	4801	39,908.07 mag ok
303	10/30/15	20:30:00	7.4	357.32	30	58.9164	N	156	36.0137	E	4720	40,004.21 mag ok
303	10/30/15	21:00:00	7.7	3.2	31	1.6642	N	156	36.0052	E	4674	40,107.90 mag ok
303	10/30/15	21:30:00	7.8	0.11	31	5.1967	N	156	35.9947	E	4608	40,241.14 mag ok
303	10/30/15	22:00:00	8.2	5.57	31	9.5922	N	156	36.0698	E	4517	40,184.75 mag ok
303	10/30/15	22:30:00	8.2	353.07	31	13.187	N	156	36.0069	E	4447	40,249.99 msg ok
303	10/30/15	23:00:00	7.9	352.4	31	17.0375	N	156	35.9965	E	4369	40,174.28 mag ok
303	10/30/15	23:30:00	8.1	4.64	31	21.8053	N	156	36.0057	E	4233	40,106.46 mag ok

Julian	Date	Time	Speed	COG	Lat (d)	Lat(m)	N/S	Lon (d)	Lon (m)	E/W	Depth (m)	Mag (nT)	Event
304	10/31/15	0:00:00	8.2	0.91	31	25.1201	N	156	35.9992	E	4239	40,163.90 mag ok	
304	10/31/15	0:30:00	8.4	5.7	31	29.1996	N	156	36.0073	E	4318	40,032.29 mag ok	
304	10/31/15	1:00:00	8.4	359.09	31	32.7635	N	156	35.999	E	4182	40,089.38 mag ok	
304	10/31/15	1:30:00	8.4	357.56	31	37.3527	N	156	35.9887	E	3981	40,311.06 mag ok	
304	10/31/15	2:00:00	8.4	5.24	31	40.7491	N	156	35.9826	E	4020.47	40,127.50 mag ok	
304	10/31/15	2:30:00	7.8	350.24	31	44.9179	N	156	36.0187	E	3939	40,126.80 mag ok	
304	10/31/15	3:00:00	7.8	359.61	31	48.6536	N	156	35.9984	E	3884	40,285.39 mag ok	
304	10/31/15	3:30:00	8.2	354.5	31	52.706	N	156	36.0075	E	3846	40,409.68 mag ok	
304	10/31/15	4:00:00	8.2	7.76	31	56.8874	N	156	35.997	E	3823	40,577.92 mag ok	
304	10/31/15	4:30:00	7.8	6.7	32	0.8794	N	156	36.0103	E	3817	40,741.15 mag ok	
304	10/31/15	5:00:00	8	353.9	32	4.8907	N	156	36.0082	E	3880	40,777.95 mag ok	
304	10/31/15	5:30:00	8	357.79	32	8.7444	N	156	36.0044	E	3902	40,826.02 mag ok	
304	10/31/15	6:00:00	7.5	7.06	32	12.4786	N	156	35.996	E	3928	40,819.07 mag ok	
304	10/31/15	6:30:00	8.8	0.97	32	16.3297	N	156	35.9832	E	4020	40,825.49 mag ok	
304	10/31/15	7:00:00	8.1	7.61	32	20.4902	N	156	35.989	E	4139	40,700.91 mag ok	
304	10/31/15	7:30:00	7.7	356.7	32	24.4498	N	156	35.9863	E	4277	40,555.30 mag ok	
304	10/31/15	8:00:00	7.6	350.02	32	29.3815	N	156	35.9859	E	4503	40,456.48 mag ok	
304	10/31/15	8:30:00	8.9	351.58	32	33.9458	N	156	35.9854	E	4767	40,507.94 mag ok	
304	10/31/15	9:00:00	8	1.02	32	37.645	N	156	35.9906	E	4799	40,519.52 mag ok	
304	10/31/15	9:30:00	8.5	0.91	32	41.0207	N	156	35.9966	E	4744	40,510.59 mag ok	
304	10/31/15	10:00:00	7.9	359.42	32	45.2402	N	156	36.0036	E	4839	40,633.00 mag ok	
304	10/31/15	10:30:00	8.7	358.89	32	49.5642	N	156	35.9994	E	4756	40,721.92 mag ok	
304	10/31/15	11:00:00	7.7	359.62	32	53.5774	N	156	36.0046	E	4915	40,715.10 mag ok	
304	10/31/15	11:30:00	7.9	1.92	32	57.5071	N	156	36.0088	E	4856	40,738.62 mag ok	
304	10/31/15	12:00:00	8.2	2.72	33	2.035	N	156	36.0066	E	4965	40,809.98 mag ok	
304	10/31/15	12:30:00	8.3	4.64	33	5.8477	N	156	35.9965	E	5087	40,756.12 mag ok	
304	10/31/15	13:00:00	8.4	12.1	33	10.8024	N	156	36.0013	E	5221	40,777.73 mag ok	
304	10/31/15	13:30:00	8.5	1.16	33	14.2569	N	156	36.002	E	5280	40,789.32 mag ok	
304	10/31/15	14:00:00	8.2	6.59	33	18.235	N	156	36.0046	E	5300	40,939.13 mag ok	
304	10/31/15	14:30:00	8.6	3.29	33	22.4419	N	156	36.0108	E	5332	41,164.76 mag ok	
304	10/31/15	15:00:00	8.9	1.89	33	26.7041	N	156	36.0098	E	5347	41,317.75 mag ok	
304	10/31/15	15:30:00	8.4	1.71	33	30.8573	N	156	36.0031	E	5347	41,421.62 mag ok	
304	10/31/15	16:00:00	8.7	359.11	33	35.337	N	156	36.0028	E	5360.17	41,280.94 mag ok	
304	10/31/15	16:30:00	8.5	359.69	33	39.3053	N	156	36.0096	E	5454	41,192.98 mag ok	
304	10/31/15	17:00:00	7.3	357.42	33	43.2754	N	156	35.9996	E	5533	41,287.25 mag ok	
304	10/31/15	17:30:00	8	355.8	33	47.1621	N	156	36.0038	E	5526	41,361.78 mag ok	
304	10/31/15	18:00:00	7.5	2.17	33	50.9582	N	156	36.0102	E	5513	41,457.51 mag ok	
304	10/31/15	18:04:30			33	51.6417	N	156	36.008	E			end of line 012, line count increased from 0404 to 0405
304	10/31/15	18:30:00	7.5	60.3	33	53.4103	N	156	38.8733	E	5504	41,488.57 mag ok	
304	10/31/15	19:00:00	7.5	56	33	55.2542	N	156	42.9389	E	5488	41,452.41 mag ok	
304	10/31/15	19:30:00	7.5	59.01	33	57.0611	N	156	47.0556	E	5468	41,470.74 mag ok	
304	10/31/15	20:00:00	7.9	56.41	33	58.7688	N	156	50.982	E	5437	41,490.49 mag ok	
304	10/31/15	20:30:00	8.2	63	34	0.5467	N	156	55.0294	E	5396	41,502.10 mag ok	

304	10/31/15	20:55:00	7.7	118.96	34	1.9661	N	156	59.413	E	5345	41,486.95 mag ok	created new mag survey FK151005_TAMU_LINE_011;
304	10/31/15	21:00:00	7.7	181.58	34	0.9307	N	157	0.0406	E			start of line 11; line count incremented from 408 to 409
304	10/31/15	21:10:00	7.5	190	33	58.0974	N	157	0.0095	E	5362	41,330.77 mag ok	
304	10/31/15	21:30:00	7.5	176.21	33	54.3548	N	156	59.9901	E	5347	41,360.53 mag ok	
304	10/31/15	22:00:00	8.3	182.25	33	50.4682	N	157	0.0022	E	5308	41,356.35 mag ok	
304	10/31/15	22:30:00	7.8	181.51	33	46.4243	N	157	0.0079	E	5261	41,337.15 mag ok	
304	10/31/15	23:00:00	7.2	179.01	33	42.7922	N	157	0.0011	E	5228	41,315.89 mag ok	

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Dapth(m)	Mag(nT)
305	11/1/15	0:00:00	8.4	178.03	33	38.7202	N	156	59.9917	E	5201	41317.47 mag ok
305	11/1/15	0:30:00	8	177.79	33	34.8438	N	157	0.0079	E	5147	41198.56 mag ok
305	11/1/15	1:00:00	8.2	176.2	33	30.4877	N	157	0.0046	E	5006	41098.49 mag ok
305	11/1/15	1:30:00	8.2	177.2	33	26.3701	N	157	0.0068	E	5138	40970.01 mag ok
305	11/1/15	2:00:00	8.3	173.97	33	22.6416	N	156	59.9957	E	5001	40864.25 mag ok
305	11/1/15	2:30:00	7.2	191.22	33	18.7789	N	157	0.0037	E	4824	40869.56 mag ok
305	11/1/15	3:00:00	7.9	181.43	33	14.7107	N	156	59.9986	E	4790	40769.33 mag ok
305	11/1/15	3:30:00	7.8	170.48	33	10.5005	N	157	0.0019	E	4690	40681.78 mag ok
305	11/1/15	4:00:00	7.7	179.22	33	7.6105	N	157	0.0001	E	4590	40693.1 mag ok
305	11/1/15	4:30:00	7.5	190.43	33	3.5422	N	156	59.9951	E	4665	40,581.67 mag ok
305	11/1/15	5:00:00	7.5	185.7	32	59.7239	N	157	0.0008	E	4662	40,662.38 mag ok
305	11/1/15	5:30:00	7.5	178.05	32	56.2001	N	156	60	E	4560	40,800.47 mag ok
305	11/1/15	6:00:00	7.5	178.6	32	42.2134	N	156	59.997	E	4514	40,785.12 mag ok
305	11/1/15	6:30:00	7.5	183.57	32	48.6368	N	156	59.9959	E	4401	40,749.13 mag ok
305	11/1/15	7:00:00	7	179.88	32	45.1346	N	156	59.9817	E	4260	40,639.99 mag ok
305	11/1/15	7:30:00	6.9	162.8	32	42.0852	N	157	0.0031	E	4205	40,608.53 mag ok
305	11/1/15	8:00:00	6.7	185.06	32	38.3506	N	156	59.9915	E	4184	40,610.77 mag ok
305	11/1/15	8:30:00	7	185.57	32	35.2713	N	156	59.9981	E	4038	40,594.19 mag ok
305	11/1/15	9:00:00	6.4	184.72	32	32.0502	N	156	59.9862	E	3941	40,540.47 mag ok
305	11/1/15	9:30:00	7.1	173.12	32	28.6398	N	157	0.0192	E	3769	40,480.54 mag ok
305	11/1/15	10:00:00	6.9	173.37	32	25.2277	N	156	59.9958	E	3612	40,484.72 mag ok
305	11/1/15	10:30:00	7.1	171.14	32	21.7993	N	157	0.0071	E	3517	40,495.29 mag ok
305	11/1/15	11:00:00	7.1	176.27	32	18.0729	N	157	0.0102	E	3434	40,484.26 mag ok
305	11/1/15	11:30:00	7.2	179.21	32	14.4209	N	157	0.0162	E	3407	40,491.30 mag ok
305	11/1/15	12:00:00	7.7	176.59	32	10.6546	N	157	0.0119	E	3404	40,560.87 mag ok
305	11/1/15	12:30:00	7.3	180.81	32	6.9513	N	157	0.0148	E	3468	40,774.66 mag ok
305	11/1/15	13:00:00	7.6	176.61	32	2.2526	N	157	0.0118	E	3543	40,630.05 mag ok
305	11/1/15	13:30:00	7.5	186.55	31	59.2222	N	156	59.9925	E	3544	40,574.86 mag ok
305	11/1/15	14:00:00	7.4	182.34	31	55.2434	N	156	59.9941	E	3590	40,436.10 mag ok
305	11/1/15	14:30:00	8.7	187.75	31	51.2245	N	157	0.0025	E	3614	40,464.47 mag ok
305	11/1/15	15:00:00	8	183.02	31	46.7316	N	157	0.0052	E	3670	40,469.00 mag ok
305	11/1/15	15:30:00	9	177.15	31	42.8657	N	156	59.9959	E	3872	40,267.08 mag ok
305	11/1/15	16:00:00	8.3	175.66	31	38.51	N	157	0.0045	E	3684	40,158.59 mag ok
305	11/1/15	16:30:00	9	179.81	31	34.0436	N	157	0.002	E	3955	40,310.83 mag ok
305	11/1/15	17:00:00	8.3	186.23	31	29.842	N	157	0	E	4040	40,175.92 mag ok
305	11/1/15	17:30:00	8.2	178.8	31	25.6505	N	156	59.9957	E	4260	39,767.26 mag ok
305	11/1/15	18:00:00	8.6	178.3	31	21.4582	N	156	59.998	E	4386	39,971.75 mag ok
305	11/1/15	18:30:00	8.3	180.43	31	17.2489	N	157	0.0026	E	4431	40,033.93 mag ok
305	11/1/15	19:00:00	7.9	181.21	31	13.0885	N	156	59.9273	E	4349	39,931.90 mag ok

305	11/1/15	19:30:00	7.7	174.62	31	9.1926	N	157	0.0647	E	4375	39,922.23	mag ok
305	11/1/15	20:00:00	8.2	182.91	31	5.2165	N	157	0.0038	E	4502	39,913.33	mag ok
305	11/1/15	20:30:00	7.8	180.56	31	1.2403	N	156	59.9968	E	4352	39,903.00	mag ok
305	11/1/15	21:00:00	8.2	192.2	30	57.5326	N	157	0.0039	E	4006	40,036.71	mag ok
305	11/1/15	21:30:00	8.2	180.4	30	53.182	N	157	0.0067	E	4570	39,845.77	mag ok
305	11/1/15	22:00:00	8.6	179.45	30	49.3657	N	157	0.0074	E	5110	39,760.74	mag ok
305	11/1/15	22:30:00	7.8	184.66	30	45.1155	N	156	59.9966	E	5148	39,687.22	mag ok
305	11/1/15	23:00:00	8.1	184.44	30	41.1017	N	157	0.0038	E	4809	39,484.01	mag ok
305	11/1/15	23:30:00	8.3	181.46	30	36.9714	N	157	0.0054	E	4733	39,632.34	mag ok

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)
306	11/2/15	0:00:00	7.7	185.04	30	33.0426	N	156	59.9987	E	4517	39,652.52 mag ok
306	11/2/15	0:30:00	8.4	176.86	30	28.8547	N	156	59.9907	E	4587	39,520.23 mag ok
306	11/2/15	1:00:00	8.3	178.57	30	24.6279	N	156	59.9956	E	4723	39,681.26 mag ok
												mag ok, end of survey line 11, multibeam line count increase to
306	11/2/15	1:30:00	8.6	175.01	30	19.5422	N	156	59.9943	E	4912	39,645.82 438. turning off sampling to download data from line 11. sampling turned on and begin surveying of line FK151005_Tamu_Line _010
306	11/2/15	1:42:00										
306	11/2/15	1:47:00			30	18.5158	N	157	1.3832	E	4973	
306	11/2/15	2:00:00	7.4	59.08	30	19.6599	N	157	3.1919	E	4962	39,621.09 mag ok
306	11/2/15	2:30:00	7.5	57.86	30	21.8074	N	157	6.4674	E	4886	39,564.67 mag ok
306	11/2/15	3:00:00	7.6	42.4	30	23.852	N	157	9.5872	E	4775	39496.33 mag ok
306	11/2/15	3:30:00	7.3	56.33	30	26.1904	N	157	13.1776	E	4947	39579.58 mag ok
306	11/2/15	4:00:00	7.4	47.74	30	28.3305	N	157	16.481	E	5085	39500.08 mag ok
306	11/2/15	4:30:00	7.8	47.13	30	30.7967	N	157	20.2571	E	5310	39,425.71 mag ok
306	11/2/15	5:00:00	7.6	31.7	30	33.1621	N	157	23.7675	E	5444	39,610.13 mag ok
306	11/2/15	5:12:00			30	34.7073	N	157	24.02426	E		begin line 10
												manually incremented linecount from 0441 to 0442
306	11/2/15	5:20:00			30	35.7939	N	157	24.0185	E		
306	11/2/15	5:30:00	8.3	4.92	30	36.8497	N	157	24.0047	E	5444	39,682.54 mag ok
306	11/2/15	6:00:00	7.5	0.93	30	40.7749	N	157	23.9994	E	5435	39,706.03 mag ok
306	11/2/15	6:30:00	8.3	1.37	30	44.7373	N	157	23.9999	E	5367	39,698.55 mag ok
306	11/2/15	7:00:00	8	354.54	30	48.5805	N	157	23.9987	E	5317	39,747.52 mag ok
306	11/2/15	7:30:00	7.8	359.55	30	52.4308	N	157	23.9995	E	5239	39,817.65 mag ok
306	11/2/15	8:00:00	8.3	4.61	30	56.24	N	157	24.0031	E	5176	39,883.96 mag ok
306	11/2/15	8:30:00	8	0.38	31	2.1563	N	157	23.9995	E	5027	40,020.79 mag ok
306	11/2/15	9:00:00	7.5	1.83	31	4.0051	N	157	24.0052	E	5025	40,046.41 mag ok
306	11/2/15	9:30:00	8.9	355.82	31	8.1078	N	157	24.0065	E	5048	39,982.76 mag ok
306	11/2/15	10:00:00	7.7	7.88	31	12.071	N	157	24.0115	E	4953	39,890.67 mag ok
306	11/2/15	10:30:00	7.5	4.3	31	16.0996	N	157	23.9938	E	4808	39,855.78 mag ok

306	11/2/15	11:00:00	7.6	5.37	31	19.9599	N	157	23.997	E	4293	39,807.03 mag ok
306	11/2/15	11:30:00	7.6	0.83	31	23.8054	N	157	24.0049	E	4263	39,743.52 mag ok
306	11/2/15	12:00:00	6.8	0.45	31	27.8604	N	157	23.9877	E	4113	39,940.64 mag ok
306	11/2/15	12:30:00	7.3	359.97	31	31.87	N	157	24.0017	E	4086	39,989.03 mag ok
306	11/2/15	13:00:00	6.9	3.64	31	36.447	N	157	24.0032	E	3989	40,068.89 mag ok
306	11/2/15	13:30:00	8.4	3.74	31	40.251	N	157	23.9976	E	3919	40,105.30 mag ok
306	11/2/15	14:00:00	8.5	5.25	31	44.3528	N	157	23.9919	E	3965	40,118.26 mag ok
306	11/2/15	14:30:00	8.5	350.25	31	49.3187	N	157	23.9903	E	3759	40,198.39 mag ok
306	11/2/15	15:00:00	9.5	2.03	31	52.7637	N	157	24.0046	E	3529	40,279.88 mag ok
306	11/2/15	15:30:00	8.6	3.54	31	56.9274	N	157	24.0008	E	3361	40,387.37 mag ok
306	11/2/15	16:00:00	8.8	357.18	32	1.0048	N	157	24.0036	E	3242	40,375.38 mag ok
306	11/2/15	16:30:00	9.5	1.53	32	5.866	N	157	23.9952	E	3151	40,478.51 mag ok
306	11/2/15	17:00:00	9.2	0.36	32	10.3176	N	157	23.9967	E	3065	40,567.74 mag ok
306	11/2/15	17:30:00	9.5	1.02	32	14.9401	N	157	24.0078	E	2995	40,594.03 mag ok
306	11/2/15	18:00:00	9.2	354.92	32	19.4166	N	157	23.9919	E	3058	40,686.58 mag ok
306	11/2/15	18:30:00	9.5	3.87	32	23.8614	N	157	23.9904	E	3109	40,776.75 mag ok
306	11/2/15	19:00:00	9	6.94	32	28.3246	N	157	24.003	E	3189	40,716.74 mag ok
306	11/2/15	19:30:00	9.2	356.71	32	32.4342	N	157	23.9893	E	3254	40,581.63 mag ok
306	11/2/15	20:00:00	8.6	5.02	32	36.9024	N	157	24.0036	E	3444	40,577.33 mag ok
306	11/2/15	20:30:00	9.5	2.04	32	41.2645	N	157	23.9996	E	3618	40,665.41 mag ok
306	11/2/15	21:00:00	8.8	359.23	32	45.3351	N	157	24.0039	E	3886	40,654.88 mag ok
306	11/2/15	21:30:00	8.3	358.81	32	49.915	N	157	24.0063	E	4077	40,638.62 mag ok
306	11/2/15	22:00:00	7.6	5.51	32	53.6563	N	157	23.9901	E	4153	40,622.63 mag ok
306	11/2/15	22:30:00	7.8	2.74	32	58.0308	N	157	24.0005	E	4193	40,657.84 mag ok
306	11/2/15	23:00:00	8.6	4.17	33	2.4967	N	157	24.0074	E	4109	40,831.64 mag ok
306	11/2/15	23:30:00	8.3	1.89	33	6.9053	N	157	23.9945	E	3909	40,909.48 mag ok

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)
307	11/3/15	0:00:00	8.3	1.31	33	10.9189	N	157	24.0015	E	4374	40,744.98 mag ok
307	11/3/15	0:30:00	8.4	1.63	33	15.0913	N	157	23.9978	E	4266	40,781.22 mag ok
307	11/3/15	1:00:00	9.1	1.61	33	20.2162	N	157	24.0027	E	4276	40,820.14 mag ok
307	11/3/15	1:30:00	8.8	357.82	33	24.2919	N	157	23.9947	E	4597	40,929.29 mag ok
307	11/3/15	2:00:00	8.6	359.07	33	28.2041	N	157	24.0009	E	4588	40,973.95 mag ok
307	11/3/15	2:30:00	9.2	0.89	33	32.7779	N	157	24.0018	E	4679	40,961.87 mag ok
307	11/3/15	3:00:00	8.8	0.6	33	37.1436	N	157	24.0029	E	4770	40,983.83 mag ok
307	11/3/15	3:30:00	8.3	1.19	33	41.5378	N	157	24.0058	E	4802	41,058.20 mag ok
307	11/3/15	4:02:00	8.6	359.38	33	46.4613	N	157	24.0005	E	4842	41,060.45 mag ok
307	11/3/15	4:30:00	8.7	2.61	33	50.3263	N	157	24.006	E	4800	41,285.53 mag ok
307	11/3/15	5:00:00	8.7	0.71	33	54.7705	N	157	24.0072	E	4706	41,402.89 mag ok
307	11/3/15	5:30:00	8.5	4.63	33	59.111	N	157	24.0074	E	4972	41,404.21 mag ok
307	11/3/15	6:00:00	8.7	353.71	34	3.4198	N	157	23.9892	E	4926	41,382.40 mag ok
307	11/3/15	6:30:00	8.3	1.71	34	7.802	N	157	24.0083	E	4959	41,381.93 mag ok
turning, end of line 10, incrementing line count from 5073 to 5074												
307	11/3/15	7:00:00	9.3	3.55	34	12.2083	N	157	23.9951	E	5073	41,443.75 mag ok
307	11/3/15	7:30:00	7.9	76.43	34	13.2057	N	157	28.5612	E	5038	41,373.59 mag ok
307	11/3/15	8:00:00	8.3	85.99	34	13.2121	N	157	33.3831	E	4889	41,352.32 mag ok
307	11/3/15	8:30:00	8.6	87.39	34	13.213	N	157	39.3011	E	4748	41,335.54 mag ok
307	11/3/15	9:00:00	8	95.54	34	13.2128	N	157	43.6767	E	4784	41,374.23 mag ok
new mag survey started FK151005_TAMU_Line_009; line incremented from 0470 to 0471												
307	11/3/15	9:23:00	8.4	131.57	34	12.9318	N	157	47.7217	E	4699	41,408.18 mag ok
307	11/3/15	9:30:00	7.7	177.22	34	12.2311	N	157	40.1532	E	4658	41,413.33 start of line 9
307	11/3/15	10:00:00	8.4	179.66	34	8.3816	N	157	47.9946	E	4520	41,357.59 mag ok
307	11/3/15	10:30:00	8.1	185.01	34	4.2624	N	157	47.9968	E	4123	41,241.39 mag ok
307	11/3/15	11:00:00	7.8	186.91	33	59.9233	N	157	48.0119	E	4449	41,321.79 mag ok
307	11/3/15	11:30:00	7.9	186.4	33	55.6088	N	157	48.0018	E	4512	41,133.49 mag ok
307	11/3/15	12:00:00	8.2	186.38	33	52.0467	N	157	47.9992	E	4554	41,042.39 mag ok
307	11/3/15	12:30:00	7.9	185.94	33	47.594	N	157	48.0016	E	4559	40,876.44 mag ok
307	11/3/15	13:00:00	8.1	185.78	33	44.1476	N	157	47.9985	E	4527	40,819.64 mag ok
307	11/3/15	13:30:00	7.4	182.94	33	39.5012	N	157	48.0112	E	4339	41,024.22 mag ok
307	11/3/15	14:00:00	7.4	176.91	33	35.9135	N	157	47.996	E	4439	41,134.30 mag ok
307	11/3/15	14:30:00	7.4	176.69	33	32.1294	N	157	48.0058	E	4201	41,112.76 mag ok
307	11/3/15	15:00:00	7	179.82	33	28.6115	N	157	48.0002	E	4110	40,995.72 mag ok
307	11/3/15	15:30:00	7.4	178.31	33	24.6798	N	157	47.9991	E	3993	40,788.77 mag ok
307	11/3/15	16:00:00	7.7	180.94	33	20.9802	N	157	48.0019	E	4011	40,677.48 mag ok
307	11/3/15	16:30:00	7.8	177.22	33	17.1335	N	157	47.994	E	3672	40,695.59 mag ok
307	11/3/15	17:00:00	8	180.81	33	13.1715	N	157	48.0071	E	3958	40,830.56 mag ok
307	11/3/15	17:30:00	8.1	178.21	33	9.1962	N	157	47.9952	E	3998	40,851.49 mag ok

307	11/3/15	18:00:00	7.7	172.02	33	5.2575	N	157	47.9991	E	3492	40,820.81	mag ok
307	11/3/15	18:30:00	7.6	182.71	33	1.3796	N	157	47.9977	E	3374	40,715.94	mag ok
307	11/3/15	19:00:00	7.9	180.3	32	57.4592	N	157	48.0046	E	3401	40,594.74	mag ok
307	11/3/15	19:30:00	7.3	176.08	32	53.656	N	157	47.9917	E	3245	40,534.53	mag ok
307	11/3/15	20:00:00	7.9	180.66	32	49.6477	N	157	48.0028	E	3132	40,570.54	mag ok
307	11/3/15	20:30:00	8.6	179.78	32	45.7724	N	157	47.9993	E	2997	40,655.52	mag ok
307	11/3/15	21:00:00	8.2	171.43	32	41.6447	N	157	47.9979	E	2943	40,853.61	mag ok
307	11/3/15	21:30:00	8.2	182.47	32	37.6445	N	157	47.9943	E	2828	40,834.78	mag ok
307	11/3/15	22:00:00	8.4	179.9	32	33.837	N	157	48.0015	E	2727	40,786.89	mag ok
307	11/3/15	22:30:00	8.6	178.88	32	29.3994	N	157	48.0044	E	2714	40,751.55	mag ok
307	11/3/15	23:00:00	8.2	177.321	32	25.2581	N	157	47.9995	E	2671	40,637.84	mag ok
307	11/3/15	23:30:00	8.6	176.79	32	21.2836	N	157	47.9959	E	2615	40,533.84	mag ok

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)
308	11/4/15	0:00:00	8.4	176.75	32	16.9883	N	157	48.0001	E	2678	40,659.83 mag ok
308	11/4/15	0:30:00	8.9	178.77	32	12.6764	N	157	48.0072	E	2832	40,596.80 mag ok
308	11/4/15	1:00:00	8.4	178.2	32	7.8709	N	157	47.9925	E	2977	40,560.81 mag ok
308	11/4/15	1:30:00	9.1	182.09	32	3.0315	N	157	47.9893	E	2963	40312.12 mag ok
308	11/4/15	2:00:00	8.8	174.55	31	59.5792	N	157	47.9945	E	2942	40,158.92 mag ok
308	11/4/15	2:30:00	8.3	176.69	31	54.9244	N	157	47.9973	E	3035	40,088.90 mag ok
308	11/4/15	3:00:00	8	185.23	31	51.0305	N	157	48.0164	E	3117	40,107.18 mag ok
308	11/4/15	3:30:00	8	181.05	31	46.7362	N	157	47.9982	E	3307	40,063.13 mag ok
308	11/4/15	4:00:00	8.6	177.66	31	42.3404	N	157	47.9996	E	3574	40,044.48 mag ok
308	11/4/15	4:30:00	8.7	179.66	31	38.1264	N	157	48.0047	E	3778	40,041.64 mag ok
308	11/4/15	5:00:00	8.4	181.49	31	33.8752	N	157	47.9985	E	3715	39,867.76 mag ok
308	11/4/15	5:30:00	8.4	181.29	31	29.6757	N	157	48.0066	E	4190	39,538.93 mag ok
308	11/4/15	6:00:00	8.8	178.65	31	25.2128	N	157	47.9917	E	4327	39,895.10 mag ok
308	11/4/15	6:30:00	9	178.18	31	20.6559	N	157	48.0102	E	4774	39,853.11 mag ok
308	11/4/15	7:00:00	9	180.18	31	16.2147	N	157	48.0001	E	5009	39,794.29 mag ok
308	11/4/15	7:30:00	9.3	181.78	31	11.7673	N	157	47.9976	E	4975	39,758.94 mag ok
308	11/4/15	8:00:00	9.4	183.73	31	6.9897	N	157	48.0022	E	4970	39,858.81 mag ok
308	11/4/15	8:30:00	9.6	182.68	31	2.1727	N	157	48.0012	E	4971	39,823.54 mag ok
308	11/4/15	9:00:00	10	177.77	30	57.6674	N	157	48.0013	E	5029	39,764.33 mag ok
308	11/4/15	9:30:00	10	179.34	30	52.479	N	157	47.9943	E	5125	39,705.07 mag ok
308	11/4/15	10:00:00	10	180.44	30	47.6907	N	157	48.0018	E	5245	39,701.20 mag ok
308	11/4/15	10:30:00	9.5	180.56	30	43.3303	N	157	48.0034	E	5320	39,609.28 mag ok
end of line												
009...finALLY;												
FK151005_Line_												
018;Line cnt.												
Incremented to												
308	11/4/15	10:49:55	9.5	176.45	30	39.5863	N	157	48.0013	E	5442	39,521.71 0000
308	11/4/15	11:00:00	9.9	231.76	30	38.6365	N	157	47.5614	E	5444	39,506.13 mag ok
308	11/4/15	11:30:00	10.4	213.66	30	33.9293	N	157	43.3316	E	5525	39,457.36 mag ok
308	11/4/15	12:00:00	10.8	213.9	30	29.9784	N	157	40.0065	E	5578	39,461.29 mag ok
308	11/4/15	12:30:00	10.1	213.49	30	25.3145	N	157	36.0701	E	5611	39,393.80 mag ok
308	11/4/15	13:00:00	10.3	213.49	30	21.4909	N	157	32.8416	E	5460	39,136.57 mag ok
308	11/4/15	13:30:00	10.6	219.13	30	17.2678	N	157	29.2723	E	5380	39,185.99 mag ok
308	11/4/15	14:00:00	10.4	222.64	30	13.2723	N	157	25.9192	E	4935.15	39,162.90 mag ok
308	11/4/15	14:30:00	10.2	218	30	8.8005	N	157	22.1476	E	2771	39,050.56 mag ok
308	11/4/15	15:00:00	10.3	216.16	30	4.4166	N	157	18.467	E	4654	39,451.53 mag ok
308	11/4/15	15:30:00	10.7	220.68	30	0.2837	N	157	14.9917	E	5144	39,576.14 mag ok

308	11/4/15	16:00:00	10.5	216.72	29	56.1669	N	157	11.5374	E	5482	39,830.46	mag ok
308	11/4/15	16:30:00	10.3	221.9	29	51.7737	N	157	7.8692	E	5853	39,325.23	mag ok
308	11/4/15	17:00:00	10.7	213.07	29	47.6362	N	157	4.3709	E	5828	39,392.07	mag ok
308	11/4/15	17:30:00	10.7	221.93	29	43.4008	N	157	0.8081	E	5824	39,385.61	mag ok
308	11/4/15	18:00:00	10.5	206.8	29	39.3403	N	156	57.4173	E	5691	39,502.04	mag ok
308	11/4/15	18:30:00	9.5	214.97	29	35.2737	N	156	54.0231	E	5820	39,514.51	mag ok
308	11/4/15	19:00:00	9.7	217.11	29	31.4569	N	156	50.8266	E	5898	39,491.76	mag ok
308	11/4/15	19:30:00	9.9	211.95	29	26.7561	N	156	46.883	E	5867	39,377.51	ditto
308	11/4/15	20:00:00	9.7	220.09	29	23.9459	N	156	44.5409	E	6058	39,261.08	mag ok
308	11/4/15	20:30:00	10.4	214.61	29	19.9317	N	156	41.177	E	6062	39,167.19	mag ok
308	11/4/15	21:00:00	10.5	215.51	29	15.2478	N	156	37.2658	E	5911	39,147.57	mag ok
308	11/4/15	21:30:00	10.5	209.65	29	11.8524	N	156	34.4407	E	5902	39,149.86	mag ok
308	11/4/15	22:00:00	10.6	217.15	29	7.3439	N	156	30.8824	E	6107	39,240.20	mag ok
308	11/4/15	22:30:00	10.2	215.96	29	2.854	N	156	26.953	E	6191	39,178.18	mag ok
308	11/4/15	23:00:00	11.2	214.78	28	58.4401	N	156	23.2883	E	6257	39,120.12	mag ok
308	11/4/15	23:30:00	10.7	213.05	28	54.2821	N	156	19.8007	E	6197	38,956.29	mag ok

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)
309	11/5/15	0:00:00	10.5	215.11	28	50.2516	N	156	16.4795	E	6021	39,983.29 mag ok
309	11/5/15	0:30:00	10.1	214.97	28	45.8996	N	156	12.8643	E	5893	39,084.87 mag ok
309	11/5/15	1:00:00	10.3	214.47	28	41.7292	N	156	9.4028	E	5899	39,989.15 mag ok
309	11/5/15	1:30:00	10.5	212.68	28	37.09	N	156	5.5412	E	6453	38,899.22 mag ok
309	11/5/15	1:55:00										XBT 30 was a bit funky near the surface, XBT 31 was better
309	11/5/15	2:00:00	10	224.2	28	33.181	N	156	2.32	E	6027	38,950.70 mag ok
309	11/5/15	2:30:00	10.6	212.69	28	28.6365	N	155	58.5471	E	5945	38,771.39 mag ok
309	11/5/15	3:00:00	10.8	210.77	28	24.608	N	155	55.2089	E	6080	38,797.85 mag ok
309	11/5/15	3:30:00	10.5	206.61	28	20.3272	N	155	51.6737	E	6006	38,818.49 mag ok
309	11/5/15	4:00:00	10.6	209.34	28	15.9544	N	155	48.0585	E	6053	38,877.32 mag ok
309	11/5/15	4:30:00	10.6	205.09	28	12.0255	N	155	44.8235	E	6116	38,781.84 mag ok
309	11/5/15	5:00:00	10.9	215.77	28	7.7373	N	155	41.271	E	6169	38,760.15 mag ok
309	11/5/15	5:30:00	10.6	214.57	28	3.3718	N	155	37.6661	E	6155	38,743.96 mag ok
309	11/5/15	6:00:00	10.8	220.24	27	59.0743	N	155	34.121	E	6108	38,705.22 mag ok
309	11/5/15	6:30:00	10.3	221.03	27	54.8294	N	155	30.6162	E	6026	38,668.12 mag ok
309	11/5/15	7:00:00	10.4	219.62	27	50.7594	N	155	27.3472	E	6052	38,687.86 mag ok
309	11/5/15	7:30:00	10.3	208.09	27	45.7204	N	155	23.2712	E	6033	38,675.45 mag ok
309	11/5/15	8:00:00	10.4	218.3	27	42.2473	N	155	20.5709	E	6063	38,687.76 mag ok
309	11/5/15	8:30:00	10.2	220.08	27	37.93	N	155	17.1429	E	6011	38,689.37 mag ok
309	11/5/15	8:46:00	6.2	217.03	27	35.62	N	155	15.33	E	5979	mag stop recording, start to recover mag mag recovered; few shark bites; transit in EEZ, all science systems turned off
309	11/5/15	9:04:00										
309	11/5/15	10:00:00			27	26.5745	N	155	8.1382	E		
309	11/5/15	11:00:00			27	18.1636	N	155	1.4589	E		
309	11/5/15	12:00:00			27	9.7165	N	154	54.7825	E		
309	11/5/15	13:00:00			27	1.2259	N	154	48.0654	E		
309	11/5/15	14:00:00			26	52.6868	N	154	41.3193	E		
309	11/5/15	15:00:00			26	44.3798	N	154	34.7681	E		
309	11/5/15	16:00:00			26	36.072	N	154	28.2155	E		
309	11/5/15	17:00:00			26	27.6069	N	154	21.5508	E		
309	11/5/15	18:00:00			26	18.9289	N	154	14.7331	E		
309	11/5/15	19:00:00			26	10.483	N	154	8.1059	E		
309	11/5/15	20:00:00			26	1.9951	N	154	1.4487	E		
309	11/5/15	21:00:00	10.7	212	25	53.6324	N	153	54.8918	E		transit; in EEZ, science systems off
309	11/5/15	22:00:00	10.2	213	25	45.3046	N	153	48.43886	E		
309	11/5/15	23:00:00	10.4	212	25	36.9105	N	153	41.8061	E		
310	11/6/15	0:00	10.1	211	25	28.5146	N	153	35.2768	E		in transit; Minami-tori Shima EEZ
310	11/6/15	1:00	10.6	214	25	19.8659	N	153	28.5132	E		

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)	
310	11/6/15	0:00	10.1	211	25	28.5146	N	153	35.2768	E			in transit; Minami-tori Shima EEZ
310	11/6/15	1:00	10.6	214	25	19.8659	N	153	28.5132	E			
310	11/6/15	2:00			25	11.2194	N	153	21.8117	E			
310	11/6/15	3:00	10.4	212	25	2.2275	N	153	14.8972	E			
310	11/6/15	4:00	10.4	213	24	53.546	N	153	8.3838	E			
310	11/6/15	5:00			24	45.0462	N	153	2.0192	E			
310	11/6/15	6:00			24	36.4975	N	152	55.6118	E			
310	11/6/15	7:00			24	27.8614	N	152	49.1493	E			transit in EEZ
310	11/6/15	8:00	10.5	215	24	19.0627	N	152	42.5651	E			
310	11/6/15	9:00	10.7	214	24	10.2661	N	152	35.9924	E			
310	11/6/15	10:00			24	1.7127	N	152	29.6378	E			
310	11/6/15	11:00			23	53.0676	N	152	23.2044	E			
310	11/6/15	12:00			23	44.2419	N	152	16.6266	E			
310	11/6/15	13:00			23	35.7085	N	152	10.2905	E			
310	11/6/15	14:00			23	26.9996	N	152	3.8191	E			
310	11/6/15	15:00			23	18.3151	N	151	57.3802	E			
310	11/6/15	16:00			23	9.7892	N	151	51.0714	E			
310	11/6/15	17:00			23	1.2939	N	151	44.7723	E			
310	11/6/15	18:00			22	52.7055	N	151	38.4221	E			
310	11/6/15	19:00			22	44.3048	N	151	32.2289	E			
310	11/6/15	20:00	9.9	214	22	36.136	N	151	26.134	E			
310	11/6/15	21:00	9.8	213	22	28.0081	N	151	20.2016	E			
310	11/6/15	22:00	10.7	214	22	19.5632	N	151	13.9883	E			transit in EEZ
310	11/6/15	23:25	10.7	212.4	22	7.3571	N	151	5.1951	E	5629		EM302 turned on, leaving EEZ, XBT launched
	11/7/15	0:00			22	2.5137	N	151	1.777	E			

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)	
311	11/7/15	0:00:00	10.4	210.49	22	2.8352	N	151	2.0159	E	5655 NA		NO MAG; ALL IS WELL
311	11/7/15	1:00:00	9.8	209.14	21	54.2508	N	150	55.8661	E	5669 NA		NO MAG; ALL IS WELL
311	11/7/15	2:00:00	9.9	213.18	21	45.7158	N	150	49.7969	E	5694 NA		NO MAG; ALL IS WELL
311	11/7/15	3:00:00	10.5	213.97	21	37.5337	N	150	44.0276	E	5748.84 NA		c
311	11/7/15	4:00:00	15.5	214.22	21	26.9114	N	150	36.22	E	5824.64 NA		NO MAG; ALL IS WELL
311	11/7/15	5:00:00	10.5	209.66	21	16.8269	N	150	29.2644	E	5878.15 NA		NO MAG; ALL IS WELL
311	11/7/15	6:00:00	9.8	212.49	21	8.0749	N	150	23.049	E	5556 NA		shallowing on starboard edge of swath
311	11/7/15	7:00:00	10	211.63	20	59.8133	N	150	17.2091	E	3814 NA		further shallowing to starboard
311	11/7/15	8:00:00	9.7	214.99	20	51.7967	N	150	11.5437	E	2945 NA		over ridge?
311	11/7/15	9:00:00	9.3	213.64	20	43.2586	N	150	5.5074	E	4216 NA		NO MAG; ALL IS WELL
311	11/7/15	10:00:00	9.8	207.34	20	35.5926	N	150	0.0793	E	4355 NA		
311	11/7/15	11:00:00	10.6	213.59	20	27.3666	N	149	54.2771	E	3114 NA		
311	11/7/15	12:00:00	10.3	213.59	20	18.5852	N	149	48.0542	E	2883 NA		NO MAG; ALL IS WELL
311	11/7/15	13:00:00	10.2	213.59	20	9.4356	N	149	45.5543	E	2609 NA		NO MAG; ALL IS WELL
311	11/7/15	14:00:00	10.4	214.45	20	0.7793	N	149	35.5525	E	4336 NA		NO MAG; ALL IS WELL
311	11/7/15	15:00:00	10.2	217.06	19	51.4546	N	149	28.9895	E	5326 NA		NO MAG; ALL IS WELL
311	11/7/15	16:00:00	10.2	209.54	19	43.9604	N	149	23.7373	E	4585 NA		NO MAG; ALL IS WELL
311	11/7/15	17:00:00	10.2	210.17	19	34.8467	N	149	17.3256	E	2647 NA		NO MAG; ALL IS WELL
311	11/7/15	18:00:00	10.3	220.48	19	26.208	N	149	11.2771	E	2641 NA		NO MAG; ALL IS WELL
311	11/7/15	19:00:00	10.3	212.35	19	17.4566	N	149	5.1888	E	5321 NA		NO MAG; ALL IS WELL
311	11/7/15	20:00:00	10	211.97	19	9.0906	N	148	59.3599	E	5421 NA		NO MAG; ALL IS WELL
311	11/7/15	21:00:00	9.4	216.43	19	1.0322	N	148	53.7444	E	4735 NA		NO MAG; ALL IS WELL
311	11/7/15	22:00:00	9.7	219.81	18	52.8584	N	148	48.065	E	3026 NA		NO MAG; ALL IS WELL
311	11/7/15	23:00:00	10.5	218.41	18	44.6551	N	148	42.3583	E	3226 NA		NO MAG; ALL IS WELL
NEW DAY													
312	11/8/15	0:00:00	9.8	214.44	18	35.7646	N	148	36.1937	E	5644 NA		NO MAG
312	11/8/15	1:00:00	10.1	214.98	18	26.7295	N	148	29.922	E	5796 NA		NO MAG
312	11/8/15	2:00:00	10.4	212.16	18	19.6331	N	148	25.0111	E	5602 NA		NO MAG

Julian	Date	Time	Speed	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(mT)	
312	11/8/15	0:00:00	9.8	214.44	18	35.7646	N	148	36.1937	E	5644 NA	NO MAG	
312	11/8/15	1:00:00	10.1	214.98	18	26.7295	N	148	29.922	E	5796 NA	NO MAG	
312	11/8/15	2:00:00	10.4	212.16	18	19.6331	N	148	25.0111	E	5602 NA	NO MAG	
312	11/8/15	3:00:00	10.6	216.29	18	10.2498	N	148	18.5182	E	6239 NA	NO MAG	
312	11/8/15	4:00:00	10.3	218.45	18	0.9831	N	148	12.1066	E	6621 NA	NO MAG	
312	11/8/15	5:00:00	10	218.81	17	52.9267	N	148	6.5242	E	7004 NA	NO MAG	
312	11/8/15	6:00:00	10.3	215.29	17	44.5202	N	148	0.7322	E	7460 NA	NO MAG	
312	11/8/15	7:10:00	10.6	216.18	17	34.2509	N	147	53.6373	E	8189 NA	NO MAG, YES NIKON	
312	11/8/15	8:00:00	10.2	218.34	17	26.756	N	147	48.4641	E	8148 NA	OVER THE TRENCH: 8663 METERS	
312	11/8/15	9:00:00	10.5	210.13	17	18.0694	N	147	42.4901	E	6029 NA	NA	
312	11/8/15	10:00:00	10.7	211.62	17	8.8426	N	147	36.1273	E	5166 NA	NA	
312	11/8/15	11:00:00	10.4	212.01	16	59.8958	N	147	29.9662	E	6619 NA	NA	
312	11/8/15	12:00:00	10.9	211.73	16	51.2004	N	147	23.9887	E	5979 NA	NA	
312	11/8/15	13:00:00	10.7	211.3	16	42.003	N	147	17.6843	E	5027 NA	NA	
312	11/8/15	14:00:00	10.6	210.75	16	33.3259	N	147	11.7224	E	2438 NA	NA	
312	11/8/15	15:00:00	10.8	212.81	16	24.1612	N	147	5.426	E	3794 NA	NA	
312	11/8/15	16:00:00	10.6	219.68	16	15.1225	N	146	59.2479	E	5039 NA	NA	
312	11/8/15	17:00:00	10.3	217.09	16	6.8175	N	146	53.5648	E	5005 NA	NA	
312	11/8/15	18:00:00	10.3	209.76	15	58.1704	N	146	47.63	E	5079 NA	NA	
312	11/8/15	19:00:00	10.3	205.33	15	49.5768	N	146	41.7729	E	5186 NA	NA	
312	11/8/15	20:00:00	10.6	215.08	15	40.9909	N	146	35.8974	E	4956 NA	NA	
312	11/8/15	21:00:00	10.5	212.52	15	32.3431	N	146	29.995	E	4492 NA	NA	
312	11/8/15	22:00:00	10.4	212.6	15	23.6945	N	146	23.9549	E	4252 NA	NA	
312	11/8/15	23:00:00	10.2	216.44	15	14.2947	N	146	17.6903	E	4009 NA	NA	

Julian	Date	Time	COG	Lat(d)	Lat(m)	N/S	Lon(d)	Lon(m)	E/W	Depth(m)	Mag(nT)	
313	11/9/15	0:00:00	10.2	212.22	15	6.6771		146	12.4859	E	3900 NA	PASSED BY SAIPAN AND TINIAN ISLANDS
313	11/9/15	1:00:00	10.1	211.21	14	58.1521		146	6.6959	E	3817 NA	NA
313	11/9/15	2:00:00	10.2	213.46	14	49.9177		146	1.0817	E	3668 NA	NA
313	11/9/15	3:00:00	9.6	208.76	14	39.8685		145	54.25	E	3487 NA	NA
313	11/9/15	4:00:00	10	212.06	14	33.4889		145	49.9233	E	3360 NA	NA
313	11/9/15	5:00:00	9.9	216.09	14	25.0209		145	44.164	E	3187 NA	NA
313	11/9/15	6:00:00	10	208.8	14	17.6973		145	39.2023	E	3061 NA	NA
313	11/9/15	7:00:00	9.4	216.19	14	9.7284		145	33.7857	E	3631 NA	NA
313	11/9/15	8:00:00	9.2	208.66	14	1.9725		145	28.5348	E	2499 NA	PASSING BY ROTA
313	11/9/15	9:00:00	10.5	254.88	13	55.2847		145	21.9184	E	2130 NA	NA
313	11/9/15	10:00:00	9.8	255.25	13	52.8719		145	11.0922	E	1761 NA	NA
313	11/9/15	11:00:00	10.4	252.96	13	50.6055		145	1.4827	E	630 NA	TEAM VAU-SAM-HAR SIGNING OFF
313	11/9/15	12:00:00	9.7	256.42	13	48.5427		144	51.2859	E	818 NA	
313	11/9/15	13:00:00	9.7	256.41	13	46.1249		144	41.0776	E	1221 NA	
313	11/9/15	14:00:00	10.4	193.21	13	38.6803		144	37.0347	E	2078 NA	DONE
Sonar survey outside Apra Harbor												
313	11/9/15	15:41		13	25.3872	N		144	35.2745	E	1414	End line 1 at 15:37
313	11/9/15	15:53		13	25.6354	N		144	35.7132	E	1236	Begin line 2
												Ending line 2 but continuing on ~1km to explore object that appeared in backscatter before starting line 1
313	11/9/15	16:28		13	28.0258	N		144	36.7286	E	1260	Saw object in backscatter "something 1"
313	11/9/15	16:34		13	28.4356	N		144	35.7275	E	1259	Start of line 3
313	11/9/15	16:47		13	28.0887	N		144	36.0366	E	1063	End of line 3
313	11/9/15	17:21		13	25.8765	N		144	36.0339	E	1012	Begin line 4
313	11/9/15	17:28		13	25.8841	N		144	36.3772	E	738	Screenshot something 2 or unknown001 (unsure of name)
313	11/9/15	17:31		13	26.2022	N		144	36.3916	E	692	Planning module extra line put into multibeam; screenshots "unknown002" and "spoil and possible object"
												screenshot Very Bright Backscatter
313	11/9/15	17:40		13	26.7657	N		144	36.4104	E	836	End line 4
313	11/9/15	17:54		13	27.6979	N		144	36.4093	E	964	Start line 5
313	11/9/15	17:58		13	27.9979	N		144	36.3919	E	815	Screenshot high backscatter 1821
313	11/9/15	18:15		13	28.0047	N		144	36.6483	E		System switched to medium water depth mode
313	11/9/15	18:21		13	27.6089	N		144	36.6522	E		Screenshot backscatter bright with tail1829
313	11/9/15	18:27		13	27.2566	N		144	36.6501	E		Screenshot 1831 elongated object
313	11/9/15	18:29		13	27.0688	N		144	36.6501	E		Screenshot 1843 - white wiggle by rock
313	11/9/15	18:31		13	26.9367	N		144	36.6518	E	468	End of line 5
313	11/9/15	18:43		13	26.1484	N		144	36.6588	E	498	Start of line 6
313	11/9/15	18:45		13	25.93	N		144	36.6675	E	399	Screenshot 1849 unknown object
313	11/9/15	18:49		13	25.9005	N		144	36.9217	E		Screenshot 1854 large block
313	11/9/15	18:53		13	26.0089	N		144	36.9123	E		Screenshot 1859 feature
313	11/9/15	18:55		13	26.1578	N		144	36.9143	E		End line 6
313	11/9/15	18:59		13	26.5252	N		144	36.9105	E	721	Screenshot 1924 turning high backscatter
313	11/9/15	19:19		13	27.984	N		144	36.9137	E	773	Start line 7 (running NE to SW)
313	11/9/15	19:24		13	28.1199	N		144	37.0623	E	564	Screenshot large backscatter item
313	11/9/15	19:35		13	27.9828	N		144	37.4241	E		
313	11/9/15	19:37		13	27.9068	N		144	37.3604	E	534	